

THE MEDICAL JOURNAL OF AUSTRALIA

VOL. II.—37TH YEAR.

SYDNEY, SATURDAY, JULY 1, 1950.

No. 1.

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THE PREVENTION OF DEFORMITY IN RHEUMATIC DISEASE.¹

By MICHAEL KELLY,
Melbourne.

THESE are exciting days for the student of rheumatic disease. A great discovery has been made that will revolutionize thought on chronic rheumatism (Hench and others, 1949). With varying degrees of discomfort we are being compelled to undergo the stimulating torment of abandoning some cherished but ill-founded beliefs. Sir Thomas Lewis (1930) once remarked that most of the accepted views in medicine were unsupported by evidence; this is especially true of much that has passed for orthodoxy in the rheumatic field. All our unproven beliefs should be held very lightly, and we should be ready at all times to abandon them without too great a struggle.

It is pleasing to reflect that Hench was led to his discovery of the effects of cortisone by pure clinical observation. He observed that under certain conditions chronic rheumatism was reversible; and while collecting such observations over many years and meditating on them, he was led by deduction alone to the secret of the reversibility. Only at this stage was the help of the biochemist required, and Hench was fortunate indeed to have at hand such a chemist as Kendall.

This triumph for clinical observation—the traditional Hippocratic method—should give heart to those practitioners who sometimes feel that they are being by-passed and left out of date by the brilliant advances in bacteriology, biochemistry and other sciences ancillary to medi-

cine. There always will be a wide field for clinical observations so long as they are recorded accurately and fearlessly. The words written by Sir James Paget in 1869 are still true today:

Receiving thankfully all the help that physiology or chemistry or any other sciences more advanced than our own can give us, and pursuing all our studies with the precision and circumspection that we may best learn from them, let us still hold that, within our range of study, that alone is true which is proved clinically, and that which is proved clinically needs no other evidence.

HORACE PERN.

In our own country and abroad this will be a memorable year for the study of rheumatic disease. Here the Australian Rheumatism Council has been founded, and at the seventh session of the Australasian Medical Congress (British Medical Association) to be held in Brisbane in May and June, 1950, the chief subject for discussion is rheumatism. While we look to the future, however, it is fitting that we should glance back and pay homage to those who have contributed to our knowledge in this arid field.

Such a one was once a member of this Victorian Branch—a country practitioner who made *arthritis deformans* his special study and who enriched its literature. From 1927 to 1934 Horace Pern, of Leongatha, contributed a series of thoughtful and original articles to THE MEDICAL JOURNAL OF AUSTRALIA. Once he read in this hall a paper that was abstracted, with favourable comment, in "The Medical Annual". He died in 1936 at the age of sixty-three years, having devoted a lifetime to the gathering of experience on a branch of medicine that cried out for independent thought. His opinions—fresh with his own experience—are borrowed not at all from the orthodox beliefs and surmises of the day. Pern pondered deeply about ways and means of preventing the sufferings of his

¹Read at a meeting of the Victorian Branch of the British Medical Association on February 1, 1950.

patients; profound insight and deep sincerity are recognizable in every line. In 1932 he wrote as follows:

I am writing this paper as a plea for cripples, to the teachers of our profession, who are responsible for the moulding of its thought, hoping to satisfy their critical faculty. I wish to show that the present day treatment of *arthritis deformans* is wrong, because it is not based on the laws of physiology and pathology; that for this



FIGURE I.

Early arthritis of metacarpo-phalangeal joints. Position adopted on attempt to close hand.

reason the prognosis is wrong; and that the disease is curable even in advanced cases as long as they have not reached a stage of permanent destruction.

It is especially suitable that I should pay tribute to Horace Pern tonight, for he made the prevention of deformity his primary objective. And the prevention of deformity in chronic arthritis is a problem that we shall always have with us.

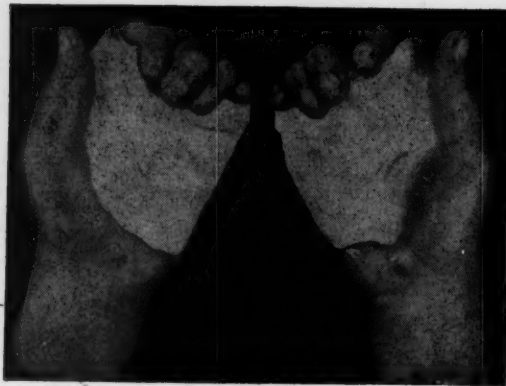


FIGURE II.

Removable plaster of Paris splints that extend the metacarpo-phalangeal joints and allow flexion of the interphalangeal joints.

A DISEASE OF JOINTS.

Rheumatoid arthritis is primarily a disease of joints; this truism is easily forgotten. Lesions in internal tissues have been rediscovered at intervals since they were described by Charcot (1853) nearly 100 years ago and by Chauffard and Ramond in 1896. Their presence supports the ancient view that rheumatoid arthritis is a constitutional disease. But they should not be allowed to blind us to the obvious truth that rheumatoid arthritis is a disease of joints. The patient complains of painful joints and begs us to relieve them; in our efforts to nullify the constitutional factor we should not forget that every diseased joint is an individual therapeutic problem. While we wait with frustrated impatience for the fruition of the studies that

commenced with the discovery of cortisone, we should remember that the first duty of the physician who treats rheumatism is the prevention of deformity. On every joint unceasing watch must be kept for months or years; even a brief period of inattention may leave an inefaceable mark.

It is a terrible reproach to us all that we have done so little towards the prevention of deformity in our rheumatic patients. The hideous deformities that we see on every side are, in most cases, preventable—we know this as a reasonable deduction, capable of proof. But medical teaching has given us no reliable rules to follow; we grope blindly in the dark and often go wrong.

Chronic rheumatic arthritis is not necessarily progressive, either for any individual joint or for the whole patient. It is an unpredictable disorder; some patients go downhill rapidly, while in other cases complete or



FIGURE III.

Rheumatoid arthritis of three years' duration. Little finger abducted when open hand resting on table. Tendon of *extensor minimi digiti* standing out.

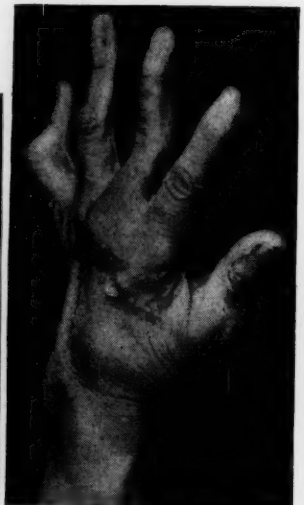


FIGURE IV.

Old rheumatoid arthritis. Hyperextension of middle joint of middle finger with flexion of proximal and distal joints.

partial remission may commence at any stage. In yet others the joints first involved may recover as others become involved. Through the years, recovery may occur in every joint except one or two, yet these may be so deformed or so painful that the patient is crippled. If deformities have not been prevented, joints no longer inflamed will be functionless. On the other hand, most patients with long-standing polyarthritis present one or two joints with gross arthritic change but full and painless range; after being continuously painful and swollen for many years, these joints have recovered while disease and deformity were progressing in other joints.

PATHOLOGICAL FEATURES.

Pathological examination of a rheumatoid joint reveals non-specific inflammatory changes that closely resemble the effects of trauma. Early there is a cellular reaction with excessive outpouring of fluid—oedema and synovial distension. Later granulation tissue appears and invades ligaments, cartilage and bone; and disorganized attempts at repair go hand in hand with destruction of tissues. Rheumatic inflammation involves fibrous tissues everywhere, but the joints are involved more commonly and with greater intensity because they are mobile. Though the root cause is constitutional, in many cases movement perpetuates the vicious circle. The synovial membrane

and the articular cartilage are constructed to permit movement, and the periarticular structures have synovial surfaces that permit sliding of one tissue on another. But when these tissues are inflamed, simple movements are injurious. And movement is a stimulus to secretion of synovial fluid.

By putting the joints at rest, therefore, we can help the inflamed tissues to return to normal and we can protect them from further damage. In almost any joint the inflammation may be abated by immobilization; and in many cases immobilization brings about a permanent or a temporary reversal of the process. The method must be used with discrimination, and it is more valuable for small than for large joints. It is more likely to succeed in early than in late cases.

DEFORMITY.

Deformity is due early to a disturbance of muscle balance, and later to fibrotic shortening of soft tissues and permanent changes in cartilage and bone. Several factors interact in a delicate balance to preserve the normal position of a joint, and when this balance is disturbed in any way a deformity is the result. Inflammation of a joint may induce reflex spasm of muscles or reflex

extension. When the wrist is resting the constant pull of gravity assists the flexors; but when the fist is clenched or the fingers are actively used the wrist is firmly fixed in extension by reflex action.

Loss of balance in one joint may lead to loss of balance in other joints. Thus walking with bent knees leads to habitual flexion of the hip and dorsiflexion of the ankle, and if this is not corrected deformity may occur in hip joints that have not been seriously diseased.

Immobility of hands and wrists leads to immobility of the whole arm, with the humerus adducted and the forearm semi-pronated. Useless hands condemn a patient to a life of inactivity; but shoulders and elbows usually retain some useful function if the fingers can be used.

The common and disabling deformities affect the hands, wrists and knees. Mercifully the hips usually escape, while arthritis of the feet and ankles seldom proceeds to complete disability so long as the knees can bear weight.

I shall limit my remarks to deformities of the fingers, wrists and knees; if these can be prevented the patient will be able to pursue many kinds of activity, and the effects of the disease on other joints will be minimized.

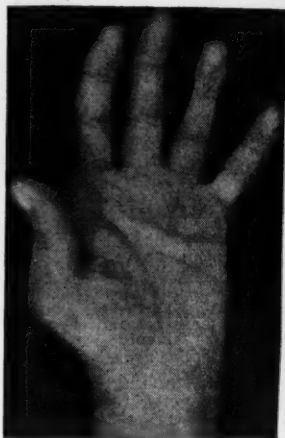


FIGURE V.

Early arthritis of proximal joint of thumb. Position adopted on attempt to extend thumb. See also abduction of little finger when extended.



FIGURE VI.

Patient shown in Figure V. Position of thumb on attempt to flex interphalangeal joint.



FIGURE VII.

Plaster of Paris splint that extends proximal joint of thumb and leaves distal joint free.



FIGURE VIII.

Splint that extends wrist and all metacarpo-phalangeal joints, leaving interphalangeal joints free.

wasting of muscles. In reflex spasm the stronger muscles (usually the flexors) overcome their weaker opponents; while wasting also results in a relative strengthening of groups of muscles at the expense of weaker groups. The following tabulation sets out the causes of deformity:

1. Disturbance of muscular balance: (a) reflex spasm, (b) wasting with overaction of opponent, (c) rupture or adhesion of tendons, (d) arthritis of a neighbouring joint.
2. External forces—for example, gravity, pressure by footwear *et cetera*.
3. Permanent shortening of muscles and ligaments.
4. Inflammatory softening of ligaments and bone.

In a healthy joint, external factors combine with muscular forces to produce the normal mean position. Thus if a joint is continually under the influence of gravity, special mechanisms are developed to assist the anti-gravity muscles. Though the extensors of the knee, for example, are weaker than the flexors, they are aided in resisting gravity by the device whereby the knee may be locked in

Deformity of Fingers.

Deformities of the fingers are the commonest and the most important, and the mechanisms by which they occur are worthy of study. Complicated mechanisms act to maintain finger balance, with reciprocal dependence of joints upon each other. Balance in finger joints is dependent upon balance in wrist joints, and *vice versa*.

The key to finger balance is the long flexor tendon which traverses several joints as it travels to its termination. *Flexor profundus*, we should remember, flexes the terminal joint, while *flexor sublimis* flexes the middle joint. Neither of the long tendons acts upon the metacarpo-phalangeal joint, which is flexed by the lumbrical muscles and deviated laterally by the interossei.

The flexor tendon sheaths are closely applied to the palmar surfaces of the wrists and the metacarpo-phalangeal joints. And when these joints are involved in rheumatic inflammation, the sheaths are often involved secondarily and the tendons refuse to slide properly. Sometimes the sheaths are involved primarily and the joints escape; this is manifested as localized tenderness on the palmar

aspect of the joint, while the dorsal aspect shows no tenderness or swelling.

Interference with the flexor tendons as they pass across the wrist or the metacarpo-phalangeal joints may lead to inability to flex the interphalangeal joints. But the lumbrical muscles are not put out of action. Thus in the early stages of rheumatoid arthritis, when only the metacarpo-phalangeal joints are involved, we often find that flexion of the undamaged interphalangeal joints is grossly limited and that all attempts to flex the fingers result only in flexion of the metacarpo-phalangeal joints and the assumption of the so-called "obstetrical position" by the hand (Figure I).

If, by plaster of Paris or other splinting, the metacarpo-phalangeal joint is supported in full extension, the lumbrical muscles will not be able to act (Figures II and VIII).



FIGURE IX.

Patient shown in Figure VIII, before application of plaster splint. Swelling of wrist and metacarpo-phalangeal joints.



FIGURE X.

Patient shown in Figure VIII, before application of plaster splint. Characteristic position of thumb. Interphalangeal joints of fingers will not flex fully.

Moreover, the position of full extension favours the full mechanical effect of the flexor tendons on the interphalangeal joints. The rest to the metacarpo-phalangeal joints reduces the inflammatory reaction and thus reduces the involvement of the tendon sheaths. Continuous or intermittent splinting of the metacarpo-phalangeal joints, therefore, not only helps to prevent deformity of these joints, but also helps to preserve the function of flexion of the interphalangeal joints.

Involvement of a joint, we have seen, may produce reflex spasm or reflex wasting of muscles that move the joint. The metacarpo-phalangeal joint is acted on by many muscles, both directly and indirectly, and the resultant effect of spasm with or without wasting may not be easy to predict. Usually, however, the fingers are straight, but the metacarpo-phalangeal joints are flexed powerfully by the long flexors and the lumbricals. If this position is not corrected in time, all ability to flex the interphalangeal joints is lost and the metacarpo-phalangeal joints may become dislocated in flexion.

Ulnar Deviation.

The interosseous muscles waste away, and most of all the first dorsal interosseous, which is a powerful abductor of the index finger. When it has been weakened the lateral balance of the finger becomes disturbed, with a tendency to adduction. This tendency is increased by gravity, whose prevailing trend is to pull all the fingers in an ulnar direction, more especially if the hand is used habitually to carry loads. When the metacarpo-phalangeal joints are habitually held in flexion, the stabilizing activity of the interossei is lost and the fingers become more easily influenced by external forces. And when the fingers have become deviated, the influence of the long flexors and extensors is to increase the deviation.

But, even with all these factors acting, ulnar deviation of the fingers is not likely to develop if the fifth metacarpo-phalangeal joint is not involved. The little finger acts as a splint to support its three fellows. If the fifth metacarpo-phalangeal joint is involved in the arthritis (and this can be diagnosed early if tenderness of the joint is discovered on palpation), its only interosseous muscle (an adductor) wastes away, and so the trend towards abduction (ulnar deviation) is begun. Reflex spasm of the *extensor minimi digiti* is a common effect, and this extensor is the strongest abductor of the little finger. It is quite common in the early stages of arthritis of the hand to see the



FIGURE XI.

Same patient eight weeks later, after removal of plaster splint. No swelling of wrist or metacarpo-phalangeal joints.



FIGURE XII.

Same patient after removal of plaster splint. Flexion of interphalangeal joints. Normal appearance of thumb.

tendon of the *extensor minimi digiti* standing out tense as the little finger is involuntarily abducted (Figures III and V).

Ulnar deviation of the second, third and fourth fingers is not likely to occur unless the fifth metacarpo-phalangeal joint is involved in the arthritis, even though these other joints may be badly damaged. This observation suggests as a remedy the splinting of the little finger in adduction.

Deformities of Interphalangeal Joints.

A common deformity of the fingers, which occurs a little later, is hyperextension of the middle joint, which may proceed to subluxation and ankylosis (Figure IV). Accompanying this we often see hyperflexion of the terminal joint with avulsion of the extensor tendon (mallet finger).

The hyperextension of the middle joint is the result of the combined action of muscular imbalance with external factors. The *flexor sublimis* is no longer acting on the middle joint, and so the unbalanced action of the common extensor, over a long period, gradually generates hyperextension. Furthermore, the patient still uses the hand for most purposes; but when she grips an object the fingers remain straight, and every effort in gripping hyperextends the middle joint passively.

Again, hyperextension of the middle joint puts tension on the *flexor profundus* tendon, which acts on the terminal joint. Acute flexion of the terminal joint is more likely to occur if it is arthritic, when the extensor tendon often becomes detached from the base of the terminal phalanx.

J. L. Insley (1949) has shown pictures of a simple wire splint that corrects this deformity and assists flexion of

the middle joint. It holds the joint slightly flexed, so that the *flexor sublimis* tendon is able to commence its action from an advantageous position.

Deformity of the Thumb.

In the thumb the metacarpo-phalangeal joint is usually attacked first, becoming swollen, tender and often acutely flexed. The flexor sheath may be involved, and the long tendon, being unable to flex the interphalangeal joint, acts too powerfully on the metacarpo-phalangeal joint, which comes to occupy a permanent position of acute flexion, with the interphalangeal joint fixed in extension or hyperextended (Figures V, VI and X).

If a splint is applied so that the proximal joint of the thumb is held in full extension, flexion of the interphalangeal joint will soon be restored by active movements (Figure VII). In a patient I examined lately, the long

lies on the palmar aspect of the wrist, and finger flexion is further impaired by damage to the long tendons.

The wrist should be splinted in 30° of extension and use of the fingers should be encouraged; after three to five weeks of fixation the arthritic process subsides. The wrist and finger joints do not become ankylosed after splinting; on the contrary, fixation leads to reduction of inflammation and therefore eventually to greater mobility after removal of the plaster splint. The return of movements should not be forced or hurried; ordinary use of the hand usually restores full mobility in a few weeks (Figures XIII, XIV, XV and XVI). A plaster cast or a moulded leather splint should be worn intermittently for a few weeks, in order to reduce the strain on the joints (Figure XVII).

Prevention of Ulnar Deviation.

Ulnar deviation of the fingers is often difficult to prevent; but once it has occurred it is still more difficult to correct. For its prevention it is necessary to restore the arthritic metacarpo-phalangeal joints to health before the deformity has had a chance to appear. In early cases continuous immobilization of the joints in extension for



FIGURE XIII.

Old arthritis of wrist, with destruction of bone and cartilage, swelling and pain on movement.



FIGURE XIV.

Patient in Figure XIII, with plaster splint applied.



FIGURE XV.

Range of painless movement three months later.



FIGURE XVI.

Range of painless movement three months later.

flexor tendons of both thumbs had been ruptured, and so there was no possibility that the interphalangeal joint could be moved.

To prevent stiffness in interphalangeal joints of the thumb and fingers I have been experimenting with plaster of Paris splints that hold the metacarpo-phalangeal joints in full extension but allow flexion of interphalangeal joints (Figures II, VII and VIII). The patient is advised to perform active flexion movements continuously. With continuous fixation the arthritic metacarpo-phalangeal joint settles down, the secondary tenosynovitis subsides and the tendons are allowed to glide more freely (Figures VIII, IX, X, XI and XII). The plaster splint can be applied selectively to immobilize only one or two joints; usually it is kept on for three to five weeks.

If the wrist is not diseased, the proximal edge of the plaster splint is just distal to the wrist. Often, however, the wrist also is involved; then it too is fixed in extension (Figure VIII).

Deformity of the Wrist.

When the wrist is diseased we should guard against flexion deformity, which may lead to permanent loss of function of finger joints that have not been diseased. Flexion of the wrist is mechanically an unfavourable position for finger function. Furthermore, the inflammation may spread to the common flexor sheath which

three to five weeks may be sufficient; but in later cases the struggle may be prolonged, and it may be necessary to use removable splints for intermittent wear. The fingers should be used freely while the joints are splinted in order to prevent wasting of the muscles, stiffness of other joints and adhesions in tendon sheaths.

I have said that the little finger holds the key to ulnar deviation; if it is not abducted the remaining fingers are unlikely to bend sideways. This view is contrary to the accepted teaching that flexion is an essential preliminary to ulnar deviation. But I have several patients under my care in whom the little finger is abducted only when fully extended (Figure III), and adducted when the fist is closed.

Accordingly, I have treated a few patients recently with a skeleton splint that supports the little finger in adduction and extension and allows the index, middle and ring fingers complete freedom of movement. Heald and others (1949) use a removable splint made of "Perspex" that prevents ulnar deviation while allowing use of the hand. A strip of "Perspex" one inch wide was heated and wrapped spirally around a plaster model of the patient's hand with the deformity corrected.

In the prevention of deformity in rheumatoid arthritis, our first aim is to persuade the inflammation of the joint to subside. Immobilization usually achieves this, and when the inflammation has subsided muscular spasm disappears. However, we may still be left with two deformity-

producing factors—weakness of wasted muscles, and external forces such as gravity. Selective exercises must be prescribed that strengthen the anti-gravity muscles. The extensors of the wrist must be exercised, directly by active extension of the wrist and indirectly by use of the fingers and clenching of the fist. The patient must be warned against the habit of letting the wrist drop into flexion; wherever possible it should be supported in extension when resting.

Deformity of Knees.

Arthritis of the hips is the greatest threat to the patient's security; the danger is ankylosis with complete immobility. Next in order of danger is arthritis of the knees, with its threat of a flexion deformity. So long as a flexion deformity can be avoided, so long will the patient be able to walk. Favouring flexion of an arthritic knee we have a number of factors: the body weight, wasting of quadriceps, spasm of flexors, the habitual flexed position when sitting and when lying in bed, the relatively comfortable position of flexion for a painful knee, the difficulty of straightening the knee and the disinclination to walk. These factors should be listed for the patient and she should be continually warned against them. She should be forbidden especially to rest the knee over a pillow and to sit in low chairs. Unending quadriceps drill should be insisted upon, and when she is sitting in a chair the feet—with the knees straight—should be stretched out on a hassock or stool. High chairs or stools should be used, and low chairs and beds should be raised upon blocks. The patient should take plenty of walking exercise, and should be careful to stiffen the knee as it takes the weight of the body.

If a patient with painful and swollen knees is referred to a physiotherapist, the objectives of treatment should be explained in detail. The physiotherapy that brings the best results is the physiotherapy that keeps in mind the function of each individual joint. The knees are intended to support the body weight. A limitation of flexion matters little compared with the loss of the last few degrees of extension. Vigorous efforts, in a painful and stiff knee, to restore full flexion are likely to intensify the inflammation and so increase the danger of a flexion deformity. The physiotherapist should concentrate on strengthening the quadriceps and on preserving the ability to extend the knee, and should forget about whatever limitation of flexion there may be.

Walking-sticks are bad for a patient with inflamed knees; she leans forward and bends at the hips and this, of course, increases the tendency of the knees to bend. Many a patient, proud of her ability to do without crutches, creeps in bent double, supported by a walking-stick. Crutches should be used early to protect the knees, of sufficient length to allow the straight knees to take portion of the weight. They should not be long enough to allow the patient to swing on them. Crutches are difficult to handle if wrists or elbows are painful; then it may be necessary to use a walking machine with crutch supports for the axillae and arm rests for the forearms.

The application of a walking caliper is useful treatment for a painful and swollen knee. At the beginning it may be worn continuously, day and night; then it may be left

off for lengthening periods. When both knees are affected they may be treated either simultaneously or one at a time. Better than a caliper in many cases is a straight plaster splint that reaches from the groin to the malleoli. It does not completely control movements of the knee and it does not eliminate weight-bearing, but it permits walking and in most cases it controls movement sufficiently to allow the swelling of the knee to subside within three or four weeks. Afterwards the plaster splint is bivalved and worn part-time. Hasty efforts should not be made to restore flexion; with ordinary use a good range of flexion usually returns in a few weeks (Figures XVIII, XIX, XX, XXI and XXII).

Importance of Weight-Bearing.

The patient should be kept walking at all costs. If the body weight is not repeatedly supported on the extended knees, the legs will soon forget that their function is to support the body weight. I dislike those therapeutic systems that advise a few weeks' rest in bed to commence



FIGURE XVII.
Moulded leather splint
for wrist.



FIGURE XVIII.
Old arthritis of knee with
straight plaster of Paris
splint.



FIGURE XIX.
Range of flexion three months
later.

treatment of rheumatoid arthritis. Not only is it an error to treat this disease with rest in bed, but it is a misfortune if the patient has to go to bed with pneumonia, or with appendicitis, or with any other intercurrent disease. She will certainly get up with weakened legs, and if they are neglected, with the commencement of a flexion deformity of the knees.

Rest in hospital is not good treatment for chronic rheumatism. If it is necessary to admit a chronic rheumatic patient to hospital, trained staff should be there to see that the correct exercises are performed frequently during the day, and if at all possible, to see that the patient leaves her bed and walks several times a day. An in-patient of a hospital too quickly becomes part of the hospital routine and remains in bed too long. And ground that is lost in a few days may take a few months to recover.

We often read, in the medical and semi-medical Press, of the desperate shortage of hospital beds for chronic rheumatism. We are asked to bewail the plight of the rheumatic patient who cannot secure a hospital bed. It is true that there are thousands of patients who would derive benefit from manipulations or operations to correct deformity. But in the routine treatment of chronic poly-arthritis rest in bed has no place. I rejoice in the shortage of beds, for I know well that many of these beds would be filled by patients who would slowly but surely lose the habit of walking.

CONTINUOUS IMMOBILIZATION.

For immobilization of joints plaster of Paris is very valuable. There is a general belief that continuous immobilization in rheumatoid arthritis leads inevitably to ankylosis; if joints have to be splinted we are advised to remove the splints once a day to put the joints through their full range. With this I agree when the inflammation is long-standing. But in many joints the inflammatory reaction will resolve completely with continuous immobilization for three to five weeks; and ankylosis will not occur after only one such period of immobilization.

In early cases the simultaneous immobilization of a large number of joints may induce a general remission of the disease. In late cases multiple joints cannot be treated, but the method may be of great value when one or two joints are stubborn but the disease as a whole is settling down.

The ideal treatment would break the circle by eliminating the cause; for this we await the mass production of a substance with the desirable qualities of cortisone. For many cases the next best course is to eliminate movement.

Immobilization of joints in rheumatoid arthritis offers two kinds of difficulty: (i) general principle: when to apply and when to discontinue immobilization; (ii) technical difficulties: how to immobilize the joint and—as far as possible—allow use of the limb and allow neighbouring joints to move.

The principles of immobilization of joints are fairly well established for tuberculosis, for acute infections and for injury. Every joint should be immobilized until all signs of activity have subsided; and then cautious active movements are begun. In an infectious disorder, recurrence of activity after movement means the re-imposition of fixation. After injury without infection, however, the rules are less stringent, and movements of the joints are encouraged in spite of some tenderness and swelling.

The question of rest *versus* movement for joints has been debated intermittently for more than a century. Appalled at the fearful results of manipulation, Hugh Owen Thomas maintained the principle of prolonged fixation. But he was unable to differentiate with certainty tuberculosis from chronic rheumatism, and acute infection from injury. He stressed the importance of "soundness" in a joint—that is, lack of infective activity—but he cared less about lack of mobility. His extremism was a reaction away from the excessive enthusiasm for movement; he had a horror of forcible manipulation of joints.

Robert Jones laid down the principle that it was not safe to manipulate damaged joints until every sign of inflammation had subsided. He said that joints infected by tuberculosis or by pyogenic organisms must not be moved at all.

Midway between infection—for which forced movements are forbidden at any stage—and injury—for which they are encouraged—stands chronic rheumatism, neither an

infection nor an injury, but seeming to partake of both. Rest relieves pain but—we are told—increases stiffness. Movements are painful and increase the swelling; but in the face of the increasing stiffness we are compelled to persevere with them. We have no fixed principles to guide us; we are told to use rest mixed with movement, but the proportions in which we mix them is left to our individual choice. But correct principles there must be. Vincent Coates said in 1933 that the treatment of rheumatoid arthritis should be orthopaedic from the start.

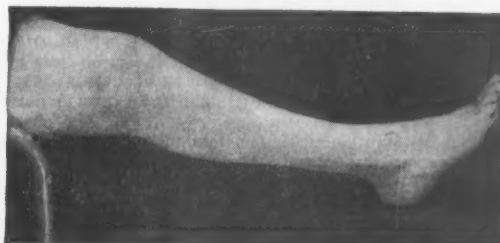


FIGURE XXI.

Patient shown in Figure XX. Extended knee joint four months after removal of plaster splint which was worn continuously for five weeks.

In rheumatoid arthritis the principles do not differ from the principles of treatment in any other articular disease. But the method of their application is different for three reasons: (i) a large number of joints may be involved; (ii) the inflammation in the joints tends to flare up again when the fixation comes to an end; (iii) the danger of ankylosis is great. But none of these difficulties is insurmountable.



FIGURE XXII.

Patient shown in Figure XXI. Range of flexion four months after removal of plaster splint, which was worn continuously for five weeks.

In general, the method means the treatment of each joint as a separate orthopaedic problem. It is more applicable to small joints than to large ones, and it is better for early than for late cases. For hands, wrists and metatarsal joints it is often of great value, and the application of plaster splints to hands or feet may be followed by improvement in other joints.

P. S. Hench and others (1948) state that, by general agreement amongst physicians, rest is held to be the most useful individual method in the treatment of rheumatoid arthritis. Yet, they state, a survey showed that only 11% of American physicians were using the method.

SUMMARY.

1. In rheumatoid arthritis each joint presents an individual therapeutic problem; the avoidance of deformity should be our primary objective, and treatment should be orthopaedic from the start.

2. The factors that cause deformity are: (i) disturbance of muscle balance; (ii) external forces; (iii) shortening of muscles and ligaments; (iv) softening of cartilage and bone. Deformity in one joint may lead to deformity in its neighbours.

3. In rheumatoid arthritis the most crippling deformities are of the hands, wrists and knees. If these can be prevented the patient will be able to lead a useful life.

4. Methods of splinting are suggested which prevent movement of the affected joints and at the same time allow use of the part. Metacarpo-phalangeal joints may be immobilized selectively to allow mobility to interphalangeal joints.

5. In many joints continuous immobilization with plaster of Paris causes the arthritis to resolve and so prevents the onset of deformity. In early cases—and more especially for smaller joints—there is little danger of ankylosis.

6. The main objective of physiotherapy is the restoration of muscle balance by selective exercises that strengthen groups of muscles. Loss of some mobility in knee joints is not a disaster so long as the power of extension is retained.

7. The incidence of deformity in rheumatic disease is a reproach to us all. It is urgently necessary that detailed rules for its avoidance should be agreed upon.

ACKNOWLEDGEMENTS.

My thanks are due to Dr. Reginald Howden, of the Arthritis Clinic of the Royal Melbourne Hospital, and to Dr. Frank May, of the Physiotherapy Clinic of Saint Vincent's Hospital, for placing clinical material at my disposal. For expert photography I am grateful to Mr. Inglis, clinical photographer to the Royal Melbourne Hospital.

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THE TRAGEDY OF STAMMERING AND ITS RELATION TO REEDUCATION.

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STAMMERING is one of the oldest of all afflictions. Herodotus, father of Greek history, tells us of a stammerer who was recommended by the oracle to go south to Libya if he would get relief from his affliction. The prophet Isaiah includes (Isaiah XII, 3) in the blessings of the Isaian kingdom relief for the stammerer. The Romans regarded stammering as an external peculiarity like squint or bandy-leggedness. The ancient writers display no knowledge of the inner factors which constitute the complaint.

In modern times the literature on the subject is very extensive, and the greatest amount of research has been done by the Germans. Most of the early theories were utterly misleading, and the practical results gained were most disheartening. As is the case today, well-meaning ignorance flourished side by side with rank charlatanism. An unpleasant interlude was the vogue, during the forties of last century, for surgical operations especially on the tongue and the tonsils, in some cases with fatal results. Only here and there was a recognition, principally by investigators who were themselves stammerers, that the affliction is of a psychic nature and cannot be treated by the knife. The multitude of theories embraced all possibilities of causation, such as malformation of the speech organs, weakness of the palate, the tongue or the tonsils, incorrect respiration, spasms of the glottis *et cetera*. Klencke in 1844 correctly located the seat of the ailment to be in the brain, and referred to "a want of freedom in the soul", but explained this by insufficient coordination of the spinal system and the brain. Another writer found stammering to be consequent on a certain debility of the nerves; this then had, and still has from an empirical point of view, much support. Others found a supposed centre of speech, as Broca's area, exposed to some injurious influence as suffusion or insufficiency of blood owing to expansion or contraction of the blood vessels. But the various irregularities of function—and there were many—which were propounded were not the object of more exact investigation (evolution of thought). In 1877 Schranck came near to the truth; he held that the will was hampered by disturbing influences, generally feelings of dread, either brought about by outer events or else suddenly entering as obsessions without external cause into the foreground of consciousness. Denhardt, 1890, truly said that the will to speak is influenced by doubts which arise as to the capacity to do so. In the last ten or twenty years investigators have come to the conclusion that stammering is a psychic ailment in the centre of which stands dread of speaking.

I have since 1911, in various articles and in addresses before the British Medical Association, London County Council school medical officers, the Witwatersrand University, Johannesburg, and interstate congresses and training colleges, interpreted stammering as, basically, a fear psychosis. I was first led independently to such a conclusion by my own personal experience of the affliction; and over thirty years' experience of stammerers who have come incidentally into my work as a practitioner has abundantly verified that interpretation. Particularly have I come to the conclusion that a satisfactory solution requires fundamental reeducation of the stammerer.

In recent years, particularly in the United States, the problem has been attacked in speech clinics (subsidized in New York School for Speech Disorders, where I lectured and demonstrated). Corrective measures, as a complexity of graded speech exercises, breathing synchronization, charting of the patients' development, are ingenious and elaborate. But the medico-psychologists in charge of these clinics are realizing that vocal and physical corrective measures, however elaborate, have not had the success which was hoped for, and that treatment must be based on the fundamental conception that stammering is a disturbance in the inner recesses of the psychic personality,

frequently a trait of a socially-sensitive soul which has come into maladjustment with its environment. Maladjustment accentuates the stammer, and freedom can be won only by a process of reeducation.

The "Individual Psychology" and its Process of Reeducation.

Exponents of Adler's individual psychology believe that stammering is a defensive barrier consciously or unconsciously set up by the patient against social life. The patient has suffered psychic reverses in his childhood; his dominance was thwarted by parent or teacher; and by a principle of compensation he has retired into a world of his own in which, in the self-confined circle of his personality, he gains success. Protected by his stammering from the claims of life, he gains in his anti-social world subjective triumphs; he is a hero, a doer of imaginary deeds.

The individual psychologists of Adler's school thus find a cause for dread of speaking in an original anti-social predisposition towards life, brought out by an unfortunate environment, a childhood conflict. It is therefore maintained by them that permanent relief can be gained by the patient only by the discovery to him of the point where he first went wrong. Relief from the affliction is thus afforded by methods of psychology, and psycho-analysis might in cases play a helpful part. The reeducation of the stammerer is involved, but speech practice is considered unnecessary.

Stammering is a Problem *Sui Generis*.

I profoundly respect the analysis of the individual psychology for its psychic approach to stammering, and the large element of truth it contains. Yet I cannot agree with its universal applicability. It virtually presupposes that there is an affinity of anti-social type among all who stammer. My experience has convinced me differently. I have known some stammerers on whom the individual psychology sheds a revealing light, and whose reeducation by its methods would go far towards a solution; but I have known stammerers of other types, some being extroverts and real social mixers. Stammerers vary widely in their social instincts, mental powers—though most are alert and sensitive—heredity, and environment.

In many cases the attempt to discover original childhood errors is futile and unimportant. The only feature common to all stammerers is the stammer itself. Supposing there have been childhood faults of setting up barriers against reality, the time yet comes when most stammerers wish to break through the barrier but cannot. They cannot do so because stammering has created its own problems and phobias; psycho-analysis back to the original faults will not necessarily help. The individual psychology does not explain imitation and shock as causes of stammering.

The control problem of treatment is stammering itself and the psychic conditions which are consequent on it (not antecedent to it). Stammering itself is the cause of maladjustment to environment, and not maladjustment to environment the cause of stammering. However stammering originates, it presents in its developed form of a fear psychosis its own peculiar problem; it is a problem in itself, not a derivative one.

Practical expression work, among other measures, is necessary in the treatment of the complaint, mainly because of the enhanced psychic equilibrium which it brings about.

Stammering a Fear Psychosis.

Some of the causes initiating stammering are "heredity" (unstable nervous temperament), shock (including war-time shell shock), change of a left-handed writer to right-handed writing, and imitation *et cetera*. A deeper question concerns whether all stammerers are born with a psychopathic predisposition to stammer, in which case the above causes may be viewed as factors evoking or exciting the latent tendency. But whatever be the origin, its significance is lost in the common problem which develops in

all cases of a true stammer. Different causes lose any separate significance. The basic condition which develops is fear—dread of speaking and fear of failure. The stammerer becomes self-conscious and fears ridicule. Speaking is accompanied by psychic storms. Indeed, some of the muscles pass into a condition of temporary "spasm"; stammering is therefore an example of a pure neurosis or psychic disturbance of function. The fear of speaking is generally greatest when the stammerer most wishes to do well. An inferiority complex develops, and dread of speaking is accentuated; thus a vicious circle begins.

Function of the Supragranular Cortex.

The function of speech is a very complex one and involves the highest activities of the brain. Indeed, if one reflects on its complexity, the marvel is not that a few individuals stammer but that so many are able to function properly. Formerly Broca's area was supposed to guide and control the motor area in the movements of speech. But this belief has been pointed out to be fallacious. In intelligent speech any number of the millions of association cortical neurons may be called on to yield up their stored impressions, and indirectly every cell in the visual area, acoustic area, or sensory area of protopathic or of deeper sensibility may become involved in some way and at some time in the function of speech. Definite localization of speech centres is therefore impossible; but the speech function is referred to a wide area on the left side of the cerebral cortex, because gross macroscopic lesions producing aphasia are almost invariably situated on the left side (in right-handed persons).

The cerebral sensory cortex is composed of several more or less distinct layers of grey matter. The infragranular layer is the first to develop, but in higher mammals there develops later a more external layer of neurons, and the cortical neuronic pathways become greatly increased in number and complexity: this is the supragranular layer, which attains its highest development in man, and is the seat of the highest cerebral function.

The function of the cells of the supragranular layer seems to be the release of nervous energy in the form of either mental reaction or inhibition, according to the individual's view of his environment. The supragranular cells also act as supervisors of the cells in the layers below. The supragranular cells also are the most highly organized and delicate of all the cells in the cortex and are the first to be affected in sleep, in shock or by drugs. The supragranular layer is the seat of inhibition, control and intelligence, and is thus of great importance in stammering.

In stammering there is no defect on the receptor side of speech; the stammerer can understand perfectly the written or spoken words. There is a defect on the effector side, not, however, an organic defect, as the stammerer can at times express himself with the utmost freedom, but a psychic defect. Stammerers can speak fluently to very young children, to animals, or when alone, but in the presence of friends and other persons are overcome by a mysterious "psycho-physical" change preventing them giving free expression to their thoughts. Nothing shows more clearly than this that the lesion is psychic and not organic.

There is obviously some inhibition of the cells of the motor cortex which are used in speech. In the stammerer the cells of the supragranular cortex exert such an inhibitory influence on the lower neurons that he requires mental effort, in the form of stress or strain, to set the mechanism of speech in action. Even when speech has commenced the "brake" of inhibition exerted by the acutely sensitive supragranular cells is so powerful that the words are jerked out by mental effort instead of flowing out in an easy, calm, effortless way. It seems that the stammerer can never attain his greatest ideal—unself-consciousness in his speaking.

Should the supragranular cells fail to exercise an inhibitory influence, the stammerer may speak as a normal individual. This may occur in alcoholic intoxication, and in stages of anaesthesia. Here the supragranular cells are the first to be affected; they are "paralysed", the lower

cells are released from inhibition, and speech is carried on naturally, with entire absence of restraint.

Ramifications of the Inhibitory System.

The excessive inhibitory reaction to the environment becomes an obsession, and its stultifying influence on the stammerer will be serious. At any moment the stammerer is subject to a combination of memories and influences which are overpowering and which divert energy to his trouble instead of towards his free expression. Recurring failures produce an expectation to stammer, introspection and loss of confidence. The stammerer becomes imbued with the idea that he cannot speak, and is in fact expected by others to stammer; both will and imagination become powerless. He is on tenterhooks lest a sudden emergency should find him wanting. Before an important interview he passes through hours of torment at the prospect of a breakdown. A tremendous amount of energy is consumed in anticipation, to the impairment of his efficiency in other directions. The fear of ridicule may induce him to attempt to conceal his stammer, with mortifying results. The more self-consciousness develops, and the more intelligent the stammerer, the greater is his distress. School days may be unhappy; oral work in the classroom is feared. Nevertheless, the development of adolescence marks a more crucial period. Conscious of his disability, the stammerer shuts himself out of social pleasures, and an amount of repression begins which may play havoc with his personality. His natural vocation may be jeopardized and natural abilities of no mean order may be misdirected. He feels he is a misfit and that he labours under a life handicap, for often the prospect of relief seems hopeless. The rewards of talent are denied. To draw less attention to his disability he may resort to shifts and subterfuges, and hence may be misjudged and his ability underrated. He is thought to stammer because he is nervous, whereas the fact is that he is nervous because he stammers. Stammering becomes an implicit directive agency shaping his life, and its ramifications are widespread. The extent of this psychic determinism varies in individual cases, but for many the picture I have here indicated is not overdrawn, and suggests above all the paramount task of the stammerer's reeducation. He must be convinced, both by remedial measures and by his own reasoning, that he has no need to be afraid.

The Nature of Corrective Measures.

The central problem is the dissolution of the psychic core of fear of speaking. The recesses of fear and misconception must be cleared away. Association with other patients is helpful, for the will to get well is contagious and the spirit of mutual help and understanding is powerful. The patient must go about his work with no attempt at concealment, and complete absence of reserve; only so can the psychic barrier be broken down and the patient feel he is building on firm ground. The feeling of ease and the elimination of strain will be a revelation, and a new outlook on life will replace the old.

The patient will gradually develop a new and agreeable method of speaking in which he will be able to speak without stammering, and his growing mastery will produce confidence instead of fear. Work is the manner of rhythmic speaking which is insisted upon invariably. Some stammerers on commencing treatment are in a state of tension and can scarcely speak at all. They need relaxation and the simplest and most elemental way of speaking. It is a well-known fact that stammerers experience no trouble in singing. Thus in practising their rhythmic speaking they both overcome their fear and achieve a new method of speech by the intonation of the parts of vocalization which require no psychic effort. The sound of all the vowels is produced in an intentionally careless drawl. The vowels are accentuated and the consonants play a small part. The rhythmic speaking is assisted by beating time as to a pendulum. Under such conditions stammering is impossible, the patients lose their self-consciousness and the barrier of want of confidence is broken down. Soft rhythmical cadence is employed in conversation with strangers in and beyond the treatment room. The manner of speaking, being full and deliberate,

is at first very noticeable, but as the patient improves in the mastery of the method by continual practice under all conditions, he is able to modify the rhythm into a pleasant and agreeable way of speaking. The rhythm in its perfected form cannot be detected as a conscious method of speaking, though it should be quite immaterial to the stammerer whether it is observable or not, his main concern being to speak without stammering and in a low-pitched voice.

The development of the method of speaking must be related to the development and unfolding of the stammerer's personality, which has been so long masked and repressed. The success of treatment depends on creating in the patient's mind a feeling of confidence and self-reliance. Auto-suggestion may be usefully employed, and any repressed complex should be patiently sought. Relaxation is insisted upon invariably. The psychic conflict is stilled, and the patient is encouraged to be free and expansive, to throw off the cloak of fear, and enter into the life of things.

The family circle and friends should comprehend that their help is needed, and should be made conversant with the technique and aims of treatment, including use of the telephone. The patient is prepared for his return to his ordinary environment. In the treatment room he reads the newspaper headlines and discusses in rhythm with fellow patients the current topics. Other types of work will be greetings and rejoinders, various forms of reading, conversation, description and narration, auction sales, speeches and debates, shopping, and such other interests as may be suggested by the ingenuity and self-reliance of the patients. Each patient should understand that he is being reeducated to remove life's handicap and the tragedy of disorientation.

Relapses will occur: there may be a reversion to the old disunity of speech, for those influences which have dissociated certain psycho-physical processes from the main personality were deep seated. The patient has, however, been made aware of the inhibitory influences and realizes that the future of his environmental relationships lies with himself. From being socially sensitive, his reeducation will make him socially free, will encourage him to break down the barriers, and the persevering application of agreeable rhythmic speaking will be rewarded by the ever-increasing confidence in its application.

I would thou could'st stammer that thou might pour out this concealed man out of thy mouth as wine comes out of a narrow-necked bottle, either too much at once or none at all. I prithee take the cork out of thy mouth that I may drink thy glad tidings.

"As You Like it", Act III, Scene 2.

HEPATOMEGALY IN THE NATIVES OF NORTHERN AUSTRALIA.

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In the course of a malaria survey of an area of the Northern Territory and the East Kimberley district of Western Australia it was noted that routine examination of the abdomen revealed a surprisingly large number of enlarged livers. As the purpose of the survey was to determine if malaria was present in the area and to ascertain the presence of the mosquito vectors, no specific inquiry into the cause of the liver enlargement was made. The various findings which may be relevant to the aetiology of this condition are detailed here.

Method of Examination.

At each locality (cattle station, police station, school, hospital *et cetera*) the person examined was given a serial number, and his name, estimated age, sex and race were recorded. The size of the liver was scored as the number of finger breadths below the costal margin at which the lower border of the liver was felt at the end of full inspira-

tion with the patient in the recumbent position. In addition to inquiries made for the malaria survey any obvious presenting signs of other illness were noted. The period of the survey was in the dry season months of August-November, 1949, and the area surveyed extended from Katherine in the east to Fitzroy Crossing in the west, and extended as far south as Sturt Creek and as far north as Wyndham. A distance of over 4000 miles was covered through country which is, in the main, flat and devoted to the raising of cattle. The area lies between the 15 and 30 inch isohyetal lines.

A "total liver size" for each age group was obtained by multiplying the size of the liver measured in finger breadths below the costal margin by the percentage of the population in the age group having that degree of hepatic enlargement and adding the results for each age group. The results obtained are shown in Table II. This procedure is somewhat similar to that employed in calculating the size of the "average enlarged spleen" for the community in malaria surveys. It suffers from the disadvantage that the measurement of the liver size in the lowest age group is disproportionately small. However, it does show

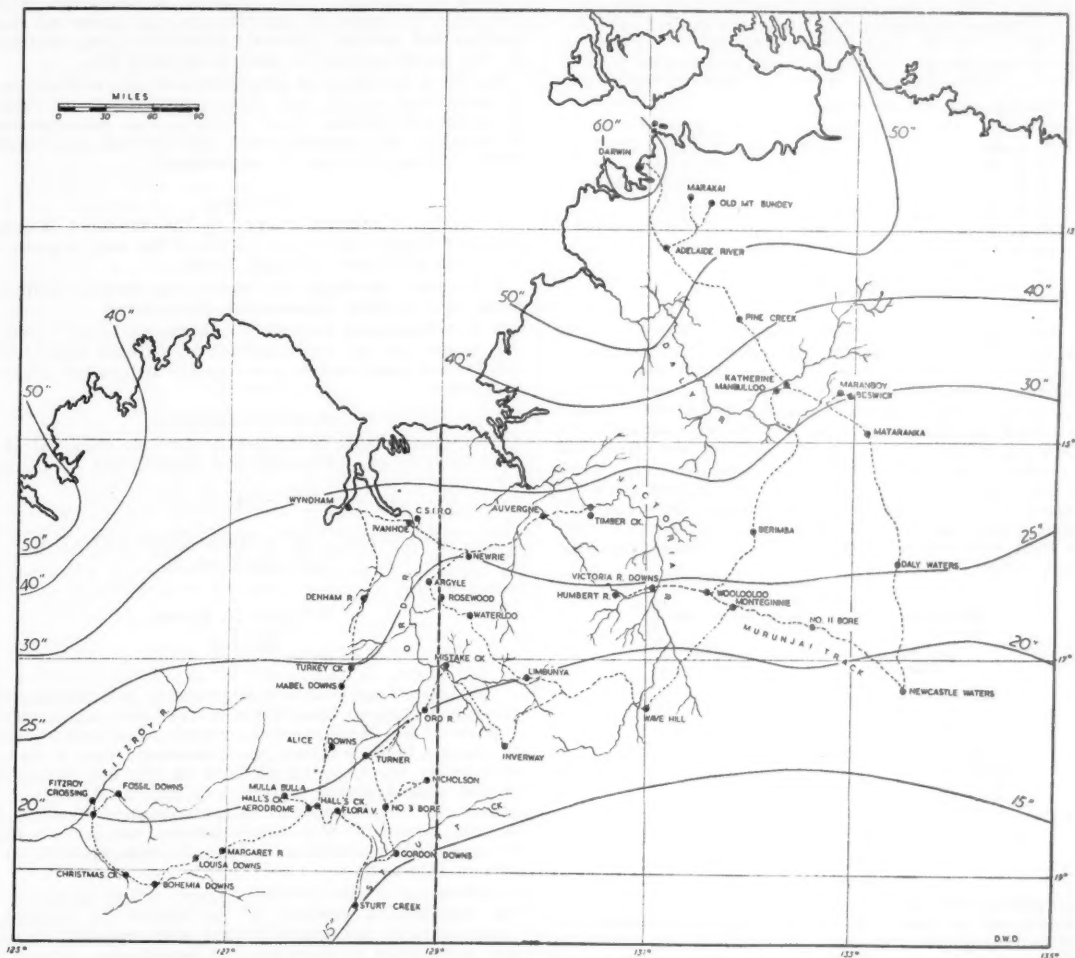


FIGURE I.

Portion of Northern Territory and Western Australia showing the area surveyed. The interrupted line represents the survey route. The average annual rainfall and main river systems are shown.

Results.

In all, 1382 natives (including half-castes and quarter-castes) were examined. Enlargement of the liver was found in 249 (16.5%) of the natives. The enlarged livers were firm in consistency with regular edges and varied in size from one to four fingers' breadth below the costal margin. None of the livers was tender. The degree of liver enlargement was as follows:

1 finger's breadth	153
2 fingers' breadth	80
3 fingers' breadth	15
4 fingers' breadth	1

Table I shows the incidence of liver enlargement found in the various age groups of the native population.

that the larger livers tend to present in the older age groups.

There appeared to be no significant difference in these findings when the two sexes were compared.

The general health of the natives appeared to be fairly good in the main, although such conditions as corneal opacities, coryza and burns in children were common. A few suspected cases of yaws and leprosy were seen. The spleen was palpable in only nine (0.6%) of the native population. No cases of jaundice, depigmentation of the skin or obvious ascites were seen.

The faeces of 23 natives were examined and ova of *Hymenolepis nana* were found in two specimens and hook-worm ova in three. No malaria parasites were found in thick blood films taken from the population examined. No

microfilariae were seen, but occasionally a relative eosinophilia was noted.

No detailed investigation was made of the diet of the natives, but, in general, it may be said to have been deficient in fresh fruit and vegetables, the main items in the ration being flour, sugar and tea in addition to the beef issued on the cattle stations. During the wet season the natives of the stations "go walkabout"—a partial return to their previous nomadic existence with a somewhat haphazard reliance on chance for their food.

TABLE I.
Incidence of Hepatomegaly in Various Age Groups.

Age Group. (Years.)	Number in Group.	Number with Enlarged Livers.
0 to 10 ^a	306	44 (14%)
11 to 20	231	43 (19%)
21 to 30	289	56 (19%)
31 to 40	234	47 (20%)
41 to 50	140	31 (22%)
51 to 60	97	19 (19%)
61 to 70	74	7 (9%)
71 to 80	10	2
81 to 90	1	0

^a Eleven years in this age group.

In this area 121 whites were examined. The liver was enlarged in 15 (12%)—mainly in males over the age of thirty years. However, four palpable livers were found in children under the age of ten years. Tenderness over the liver area was noted in six cases. No palpable spleens were found amongst the white population. At many of the stations a kitchen garden and orchard were kept and the produce was used for the homestead table. Fresh milk was obtained from goats. The white population is not a normal one, as children are sent away to school and there is a preponderance of males of the older age groups. It is thus proposed to discuss the liver enlargement only as seen in the natives.

TABLE II.
"Total Liver Size" for Various Age Groups.

Age Group. (Years.)	"Total Liver Size."
0 to 10	18.9
11 to 20	23.4
21 to 30	28.8
31 to 40	29.5
41 to 50	34.2
51 to 60	34.0
61 to 70	21.5

Discussion.

It appears that an enlarged liver commonly occurs at an early age in these natives and that the enlargement persists throughout life, some increase in size occurring with increase in age. This hepatic enlargement is not associated with jaundice and no obvious cases of ascites were seen. After the age of fifty years the percentage of the population with enlarged livers falls. This observation may mean either that the liver becomes reduced in size or that the death rate amongst those with enlarged livers is higher than that of the natives with a liver of normal size.

The information available is insufficient for absolute determination of the aetiology of this hepatic enlargement, but it does allow some discussion of the differential diagnosis of the condition. Two groups of liver disorder require discussion—the parasitic and the nutritional.

Malarial hepatomegaly can be dismissed since the spleen rate for the total population was only 0.6% and no malaria parasites were seen in the thick blood films. Kala azar has not been reported in the area, and here, too, the spleen would be enlarged. Hydatid disease is uncommon in the tropics, there are no sheep in the area and the liver enlargement seen here is uniform. Schistosomiasis causes

hepatomegaly before splenomegaly, but the type of country is not characteristic and there are no urinary or gastrointestinal indications of this infestation.

Nutritional disorders such as rickets, acute beriberi and kwashiorkor may cause enlargement of the liver. The enlargement in rickets is seen in infancy and that of beriberi in the acute stages with cardiac failure. Kwashiorkor or malignant malnutrition is an acute phase of a condition of chronic subnutrition in which fatty infiltration of the liver occurs together with anaemia and changes in the plasma proteins. The fatty changes in the liver may proceed to cirrhosis. The condition is associated with a diet poor in first-class protein and an excess of carbohydrate and possibly parasitic infestation may accentuate it. The syndrome has its onset at an early age.

The liver enlargement described here seems likely to be of nutritional origin, but further investigations such as a nutritional survey, liver biopsies and parasitological, biochemical and haematological observations are required before the aetiology can be established.

Summary.

1. During a malaria survey in the Northern Territory and East Kimberley district 16.5% of the natives examined were found to have enlarged livers.
2. Information which may be relevant to determining the cause of this liver enlargement is reported.
3. It is suggested that the hepatomegaly is of nutritional origin and due to the condition of chronic subnutrition, but further observations are required before the diagnosis is certain.

Acknowledgement.

This contribution is published with the approval of the Director-General, Commonwealth Department of Health.

"MYANESIN" AS A RELAXING AGENT IN ANÆSTHESIA.

By CLIVE N. PATON,
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"MYANESIN" made its first appearance as a relaxing agent for use in general anaesthesia in 1947 and, although early reports of its employment were favourable and promising, it appears to have fallen into disfavour. This is no doubt due partly to the rapid advance in the use of the more potent and dramatic curare and allied substances, and partly to certain alleged pharmacological disadvantages which "Myanesin" was said to possess, namely, a tendency to produce hæmoglobinuria and thrombophlebitis at the site of injection.

Reference to its pharmacological action indicates that its outstanding feature is its ability to depress the excitability of the spinal reflexes and especially to reduce the hypertonia of light general anaesthesia. It has been shown to have no action on the neuro-muscular junction or on acetylcholine.

These facts led one to suppose that in earlier tests the preparation had been submitted to trials for which it was not pharmacologically suited, such as the establishment of complete relaxation in the performance of major abdominal surgery. In this respect it has often been subjected to unfavourable comparison with curare and other curare-like preparations.

It has one very definite advantage for certain types of surgery, and that is that it does not, in therapeutic doses, depress natural respiration. It is also free from the occasional incidence of dangerous bronchospasm, and the not infrequent prolonged hypotension not uncommonly seen after the use of curare and allied substances.

Its administration does not, therefore, require the services of an expert, and can be managed by any reasonably competent occasional anaesthetist. Indeed, experience

in the following series of cases suggests that the judicious use of the preparation in suitable cases by such anaesthetists would be far less objectionable and hazardous than the administration of dangerously high doses of thiopentone in vain efforts to secure a relaxed and passive patient.

There are many surgical adventures for which thiopentone is the anaesthetic agent preferred by surgeon and patient alike. Prominent among them are the numerous types of orthopaedic procedure carried out upon the extremities, extraabdominal gynaecological procedures, urological procedures, cure of various types of hernia and the wide variety of operations carried out by the plastic surgeon.

In these operations, as most anaesthetists and many surgeons are aware, difficulty is experienced in abolishing the spinal reflex response to the surgical traumatic stimulus, and in keeping it subdued without using disproportionately high doses of thiopentone. This leads to objectionable respiratory and circulatory depression, and a disturbingly slow recovery period.

It was decided to conduct anaesthesia in a fairly large range of cases of this type, using thiopentone as the main or even the only anaesthetic agent, and employing "Myanesin" as a relaxing agent. In this manner it was thought to discover whether "Myanesin" was able to remove the troublesome hypertonia of light thiopentone anaesthesia, and so avoid excessive dosage with the latter and its objectionable sequelae.

Chemistry.

"Myanesin" is the trade name for α :B-dihydroxy- γ -(2 methyl-phenoxy) propane. It is sold in ampoules containing 1.0 gramme of the drug in 10.0 millilitres of a solvent, the exact nature of which is unknown, but which is said to contain alcohol and propylene glycol. The solution is clear and amber coloured, but in very cold weather the substance tends to fall out of solution, and the ampoule must be warmed before use to redissolve the precipitate. The solution is readily miscible with saline, dextrose and thiopentone solutions of the commonly used concentrations.

Pharmacology.

"Myanesin" produces muscular relaxation in moderate doses, and paralysis in larger doses, by depressing the reflex excitability of the spinal cord. In general anaesthesia, it therefore reduces or abolishes the muscle hypertonia associated with the lighter planes. As this hypertonia is a feature of general anaesthesia with thiopentone, "Myanesin" appears to have a potentiating effect on the anaesthetic agent (Underhill, 1949). It acts quickly, usually in about two minutes after injection, the effect of a moderate dose begins to disappear thirty to forty minutes after injection, and the dose is excreted by the kidneys in one hour. It has no action on the myo-neural junction, nor upon acetylcholine: the central neurons are unaffected by it, and it has no effect on respiration, except in very large doses.

It is said to be strongly haemolytic, and in fact has some local haemolytic action at the site of injection, owing to the highly alkaline and hypertonic nature of the solution (Underhill, 1949). But there is no evidence of gross haemolysis of any clinical significance. The preparation has no noticeable effect on the laryngeal reflex. It has been said to cause local venous thrombosis and phlebitis at the site of injection (Griffith *et alii*, 1949; Marshall, 1948).

Reports vary as to the frequency and severity of this complication.

Clinical Application.

In this series of 220 cases of the use of "Myanesin" as a relaxing agent, general anaesthesia was established in most cases by the use of thiopentone only, or balanced anaesthesia with the use of thiopentone, nitrous oxide and oxygen. The patients were selected only in so far as the nature of the surgery intended was concerned, and not on the score of physical fitness, age *et cetera*. All operations were those in which peripheral stimulation was

marked and the level of anaesthesia was maintained in as light a plane as possible. The 220 operations are set out in Table I.

Technique.

In the vast majority of cases, the solution was used in 10% solution, as delivered in the ampoule. For a few of the older patients, it was diluted to one of 5%. Induction of anaesthesia was usually carried out with 10.0 millilitres of a 5% solution of thiopentone along the usual lines. The syringe was then disconnected, the intravenous needle being left *in situ*, and a second syringe containing 10.0 millilitres of "Myanesin" was substituted. The injection of "Myanesin" was made slowly, a full minute being occupied by the injection of the 10.0 millilitre dose. Injection of thiopentone was then resumed in intermittent doses, a 2.5% solution being used for this purpose.

In 96 cases, balanced anaesthesia was instituted with nitrous oxide and oxygen as the complementary agent; in four cases cyclopropane was used; and in seven cases a minimal amount of ether.

In all remaining cases, anaesthesia was conducted with thiopentone only, oxygen being supplied to the patient by a naso-pharyngeal airway fitted with an Ayres "T" piece. As

TABLE I.

Type of Operation.	Number of Cases.
Gynaecology:	
Perineal repairs	49
Abdominal section	6
Minor procedures	7
	62
Orthopaedic surgery:	
Operations on knee	13
Operations on leg, foot, toes	37
Operations on forearm and hand	16
Manipulations	9
Amputations	3
	78
General surgery:	
Herniorrhaphy (all types)	25
Appendicectomy	7
Plastic operations	10
Mastectomy (simple)	3
Thyroidectomy	3
Cure of varicocele and hydrocele	6
Amputation of penis	2
	56
Anal surgery:	
Hæmorrhoidectomy	3
Urology:	
Transurethral prostatic resection	14
Cystoscopy	6
Orchidectomy	2
	21
Total	220

the series of cases progressed, it appeared that the desired relaxing effect could usually be obtained by using 6.0 or 7.0 millilitres of "Myanesin" as an initial dose, the remainder being given subsequently when the effect of the initial injection was expended.

Premedication.

In almost all cases, premedication consisted of "Nembutal", one and a half grains, given one hour before operation, with a combined injection of morphine sulphate, one-sixth of a grain, and atropine sulphate, one one-hundred-and-fiftieth of a grain, given half an hour before operation. The only exceptions were those in which the age of the patient necessitated some modification. The ages of the patients anaesthetized varied from eight to seventy-six years, the diluted solution of "Myanesin" being used for the very young and very old.

General Observations.

In all cases there was a very definite increase in muscular relaxation after the administration of "Myanesin", and surgery was conducted on a lighter plane of anaesthesia

than usual. Large doses of thiopentone were unnecessary, and recovery from operation was rapid and uneventful. In no case was there any reduction in respiratory activity, or change in pulse rate or blood pressure readings, attributable to the use of the drug.

Six patients developed thrombophlebitis in veins used for injection. Curiously enough, in two of these cases, in which separate veins were used for the injection of thiopentone and "Myanesin", the condition occurred at the site of the thiopentone injection. However, in all six cases the area involved was small, and the condition, causing no inconvenience, subsided in a few days. No instance of hæmoglobinuria was detected in the entire series.

Individual Groups of Operations.

Gynaecology.

The bulk of the cases in the gynaecological group consisted of 49 cases of perineal repairs, mostly of the Fothergill type. The patients in general were of the fat, middle-aged type, but varied in age from thirty-seven to seventy-four years. Light anaesthesia was induced and maintained by a combination of nitrous oxide, oxygen and thiopentone. Six millilitres of "Myanesin" were given in each case when induction was complete, and a further 4.0 millilitres were given immediately before repair of the perineum was commenced. The operation, usually of 80 to 90 minutes' duration, was completed with the use of an average of slightly less than 1.0 gramme of thiopentone, and was characterized by satisfactory relaxation, absence of respiratory stimulation or stridor during perineal manipulations, and rapid recovery from anaesthesia. The small number of abdominal sections in women of slight build were conducted under balanced anaesthesia with thiopentone, nitrous oxide and oxygen. Adequate relaxation was established with the use of one 10 millilitre dose of "Myanesin", and a smaller dose of thiopentone (0.8 gramme) was required than is usual when "Myanesin" is not used.

Orthopaedic Surgery.

In the orthopaedic branch of surgery, the relaxing action of "Myanesin" and its potentiating effect on the action of thiopentone were aptly demonstrated. The numerous operations on the extremities were commenced after the administration of 0.5 gramme of thiopentone and 8.0 to 10.0 millilitres of "Myanesin". Maintenance was conducted with a 2.5% solution of thiopentone. Oxygen was concurrently administered by naso-pharyngeal tube in this group of cases. There was complete skeletal relaxation, and there was a very definite potentiating effect on the action of the relatively small doses of thiopentone used.

For manipulative procedures, the relaxing action of "Myanesin" was most obvious, and the amount of anaesthetic agent used surprisingly small.

Some examples are:

Manipulation of shoulder: thiopentone, 0.5 gramme; "Myanesin", 8.0 millilitres.
Manipulation of spine: thiopentone, 0.7 gramme; "Myanesin", 8.0 millilitres.
Manipulation of hip: thiopentone, 0.7 gramme; "Myanesin", 8.0 millilitres.

General Surgery.

In the general surgery group 25 patients were anaesthetized for the cure of hernia. Relaxation was as satisfactory as with spinal analgesia. Twenty-two were robust male patients undergoing cure of inguinal hernia, and another had both sides operated upon. Over this small series the average amount of thiopentone used was 1.0 gramme, and of "Myanesin" 8.0 millilitres, oxygen being administered in each case by naso-pharyngeal tube. In plastic operations, all of which necessitated gross peripheral stimulation, the value of "Myanesin" was most pronounced.

Anal Surgery.

Only three cases of hæmorrhoidectomy are recorded. They are those in which the patient declined to have low spinal analgesia. Light anaesthesia in each case was induced and maintained with 0.8 to 1.0 gramme of thio-

pentone, and 10.0 millilitres of "Myanesin" produced satisfactory relaxation of the anal sphincter.

Urology.

In urological surgery, "Myanesin" was found to be of value in the carrying out of transurethral prostatic resection on feeble, elderly men who were poor surgical risks. The average dose of thiopentone was 0.8 gramme and of "Myanesin" 8.0 millilitres. The time of operation varied from twenty minutes to one hour fifteen minutes. There was complete relaxation, with an entire absence of kicking and straining so often seen in response to the stimulus of the endothermy current in this surgical procedure. Recovery after the comparatively small dose of thiopentone was reasonably prompt, so that the patient's cooperation was forthcoming without delay.

Of the patients undergoing cystoscopy, one suffered from advanced Parkinson's disease and one was an elderly achondroplastic dwarf with marked spasticity in the extremities. In each instance "Myanesin" was administered first. Sufficient relaxation was obtained to enable the patient to be placed in the lithotomy position and light thiopentone anaesthesia to be proceeded with.

Summary.

1. Experience is reported of the use of "Myanesin" as an auxiliary relaxing agent in 220 surgical operations of selected types: when activity of the spinal reflexes is an obstacle to the conduct of satisfactory light, general anaesthesia, or when the anaesthetic agent employed predisposes to hypertonus of the skeletal muscles. Such cases are encountered mainly in the fields of orthopaedic surgery, gynaecology, urology and some types of general surgery. "Myanesin" "potentiates" the action of thiopentone, and of balanced anaesthesia with thiopentone, nitrous oxide and oxygen, and allows operations in the above surgical fields to be conducted under comparatively light anaesthesia.
2. The preparation has no depressing action on respiration or circulation in ordinary doses.
3. The incidence of thrombophlebitis was no greater than is experienced with the intravenous use of thiopentone alone. In the few cases in which it was encountered, it was of minor character and short duration.
4. No instances of hæmoglobinuria were detected.
5. In only one case was it found necessary to give more than 10.0 millilitres of "Myanesin". This dose, used judiciously, appeared to achieve satisfactory relaxation in operations lasting up to four hours.

Conclusion.

"Myanesin" has a useful place as a relaxant in anaesthesia for certain types of surgical operation, and does not appear to suffer from any serious pharmacological disadvantages, sufficient to prohibit its use in its proper sphere.

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Addendum.

Since the completion of this series of cases "Myanesin" has been used as a relaxant in a further 86 operations. These were, in general, of the same type as the former series, and consisted of:

General surgery	24
Orthopaedic surgery	26
Gynaecology	26
Urology	7
Plastic surgery	3
Total	86

The general anaesthesia used was of the same type as formerly, and the same uniformly acceptable results were observed.

There were no cases of thrombophlebitis, nor of hæmoglobinuria, and "Myanesin" is now used as a routine relaxant in cases of the type indicated.

In the latter half of this supplementary series of cases, the "Myanesin" solution was diluted with an equal quantity of sterile distilled water. It was found that the relaxing effect could thus be extended over a longer period, and the diluted solution was considered possibly less likely to cause thrombophlebitis.

FOREIGN BODIES IN THE FOOD PASSAGES OF CHILDREN.

By J. W. WOODBURN,
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Brisbane.

THE presence of a foreign body in the food passages of children is common, causes much anxiety, and requires the exercise of a considerable amount of judgement by the medical attendant. Small, smooth objects usually pass harmlessly through the alimentary tract in a few days. Generally in such cases the children can be treated as out-patients, with suitable instructions to the parents. After a careful history and examination, a confirmatory X-ray examination may not be considered necessary. On the other hand, children who swallow a sharp or large object should be admitted to hospital for operation or closer observation, being kept in hospital until a successful conclusion is reached, or until the object has advanced sufficiently to warrant a change to out-patient supervision for the rest of the journey.

Fifty patients with swallowed foreign bodies have been admitted to this hospital in the past three years. A small number were minor cases, the children being admitted to hospital because of compelling circumstances. Two cases of somewhat more than usual interest have been encountered recently, so it is thought that a description of these and a short general review may prove of interest. No attempt will be made to deal with cases of foreign bodies inhaled into the air passages.

Foreign Bodies in the Oesophagus.

In the twelve cases of foreign body in the oesophagus, the objects swallowed were as follows: four coins, two round whistles, two open safety-pins, one badge with a clasp pin and three other objects.

The ages of the patients ranged from ten months to nine years, but most of the children were aged under four years.

Treatment seems to be fairly well standardized, and all these children were treated by X-ray examination, oesophagoscopy and removal of the foreign body under general anaesthesia. Oesophagoscopy was unsuccessful in two other cases, as the article had passed into the stomach. Often a careful history and clinical examination will serve to distinguish between an object in the food passages and one in the trachea or bronchi. In the older child symptoms may prove a useful guide. In all cases an X-ray picture should be taken just prior to oesophagoscopy, and with non-opaque foreign bodies the ingestion of a small amount of barium may be helpful.

Children from the Brisbane area usually had their extraction performed within eight hours of the mishap. There is little to be gained from delaying operation, as this will increase the dangers of ulceration, perforation and mediastinitis, while there is only a small chance of the object's passing onwards. If it does so, it may lodge at a lower level of the oesophagus, rendering removal more hazardous, and should it pass into the stomach further trouble may lie ahead.

Removal through an oesophagoscope usually is not very difficult, and can be performed with some tuition. Suitable instruments must be available, and all larger country hospitals could well be equipped to enable this procedure to be carried out.

The open safety-pin lying point upwards in the oesophagus is a problem. Should closure or rotation be unsuccessful or impracticable, it is best to push the pin onwards, and turn it into a gastro-intestinal foreign body.

There are three usual sites of obstruction: (i) in the post-cricoid region, (ii) at the level of the left bronchus and the aorta, (iii) at the level of the diaphragm. Of the twelve foreign bodies in this series, nine were found in the post-cricoid region, and three below this level. No complications were encountered in any of these cases.

Foreign Bodies in the Gastro-Intestinal Tract.

There were 38 children with foreign bodies in the gastro-intestinal tract admitted to hospital. The objects swallowed were as follows: pins and nails, eleven cases; glass fragments, six cases; open safety-pins, four cases; bobby pins, four cases; badges with clasp pin, three cases; coins (up to one penny at fifteen months), three cases; other objects, seven cases. No trichobezoars were encountered.

The two following cases are of interest.

CASE I.—T.A., a male baby, aged six months, swallowed a two and a half inch bobby pin on November 8, 1949. An X-ray film revealed its presence in the stomach. The baby remained symptomless on a normal diet. Further X-ray films were taken and showed the pin to be in the same position. On November 14 it was decided to perform a gastrostomy the following day. However, the foreign body was passed early the next morning, seven days after the misadventure.

CASE II.—J.K., a female infant, aged fourteen months, swallowed an open safety-pin at midday on December 2, 1949. The pin was one and five-eighths inches in length and about seven-eighths of an inch wide at its widest part. X-ray examination showed it to be very low down in the oesophagus. An ear, nose and throat consultation was obtained, and a conservative policy was adopted in the hope that the pin would travel the short remaining distance to the stomach of its own accord. On December 3 the X-ray examination was repeated, and showed no progress. The child was then fed and the pin passed onwards into the stomach. On December 5 the pin was in the position of the duodenum, and thereafter it made steady progress, being passed uneventfully seven days after its ingestion. The infant was symptomless throughout.

Discussion.

The ages of the patients ranged from three and a half months to nine years.

Children treated as in-patients should have the foreign body checked by X-ray examination every day or every second day. Glass, unless it contains lead, will not be seen in an X-ray film.

Once objects enter the stomach, the great majority will pass through the gastro-intestinal tract without causing symptoms. An object which can be swallowed by a baby will pass almost as readily as it would in an older child.

The most worrying patients are children who have swallowed elongated articles, especially if they are sharp. Many advise surgical removal from the stomach, as it is possible that such items may cause perforation and fatal peritonitis. Operation was not carried out in any such case in our series. X-ray films were taken frequently, and the children were kept under constant observation. We were, perhaps, fortunate in that all foreign bodies, even the most dangerous ones, moved onwards in what could be considered a reasonable time, and were passed normally in from one to fifteen days. Purgatives were withheld and a normal diet was prescribed.

When dangerous objects are present in the stomach, the possibilities are as follows.

1. They may remain in the stomach, seldom causing any damage if they are removed within a reasonable period. Removal is not very difficult.

2. They may pass into the duodenum and stay there. Long objects are likely to be arrested in the second or third parts, and especially at the duodeno-jejunal flexure. They are said to be dangerous if left there for six to eight days, though sharp objects have been known to cause perforation in less time than this. There are cases

on record in which the foreign body has been left in this region for one month and eventually has been passed in the faeces. Surgical removal from the duodenum is difficult and liable to post-operative complications. An attempt to juggle the article back through the pylorus may be successful.

3. They may pass beyond the duodenum, and rarely become arrested in, and perhaps perforate some lower portion of the bowel, notably the caecum.

4. They may pass harmlessly right through the tract.

It is often difficult to decide whether to operate or not. Conservative treatment is the treatment of choice, and laparotomy should be undertaken only when specifically indicated. Left alone, almost all cases will come to a happy conclusion, but the rare, complicated case may well end fatally.

Some possible indications for surgical intervention are suggested: (i) the presence of long, sharp objects in the stomach, or objects which are thought too big to pass the pylorus; (ii) foreign bodies which remain for five days or more, at any one level, more so if they are sharp and seem to be stationary; this applies especially to the duodenum; (iii) perforation or intestinal obstruction—either will require immediate surgical treatment.

Large foreign bodies, particularly those in the stomach, are readily located; but small objects, being removed because of their sharp nature only, may be difficult to locate, particularly if they have entered the intestines. A prolonged search for such a foreign body can cause the patient considerable shock.

Contrary to what may be experienced with adults, in this series no sharp foreign bodies became impacted in the anal region.

Charity badges should not be sold in the out-patient department of a children's hospital.

Acknowledgements.

My grateful acknowledgement is made to the members of the visiting and resident staffs of the Brisbane Children's Hospital, who have been associated with these cases, for permission to publish many of these details.

Summary.

The results obtained in a series of cases of foreign bodies in the food passages are described, difficulties are mentioned, and possible lines of treatment are discussed.

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Reports of Cases.

BITE BY FUNNEL WEB SPIDER.

By R. E. MURRAY,

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ALTHOUGH five deaths are recorded from the bite of the funnel web spider (*Atrax robustus*), often called a "trap-door" spider, there are only three clinical descriptions of cases recorded in which recovery occurred (Taylor and Murray, 1946). Probably a number of cases have occurred with trivial results, but either the patient has not sought medical advice or the medical man consulted has not bothered to record the occurrence. Musgrave (1949) mentions that many such cases occur.

Strangely enough, in all recorded cases in which the spider concerned was captured and identified, it was found to be a male; no proof has been found in the medical literature that the female will bite, although the female Arachnid is usually more formidable than the male. However, Mr. Musgrave informs me that he is aware of three cases in which the spider was proved to be a female *Atrax robustus*: the first was in 1933, when a boy, aged seven and a half years, was bitten at South Lakemba Infants' School, the second in 1934, when a married woman was bitten at Lane Cove, and the third in 1941, when an adult woman was bitten at Epping. The three patients recovered.

Clinical Record.

A further case is now recorded in which the spider was a female. The patient, A.B., an adult male, was working in his garden in the Sydney suburb of Haberfield, when bitten on September 1, 1949. Being interested in spiders, he saved the specimen, which was later identified at the School of Public Health and Tropical Medicine as a female *Atrax robustus*. By courtesy of the medical superintendent of the Royal Prince Alfred Hospital, the following notes on the case were supplied by the resident medical officer, Dr. Bruce Noake, who saw the patient in the casualty department:

The patient had presented to his own doctor, who scarified the wound. He reached the casualty department of Royal Prince Alfred Hospital one hour later. On examination there was an area of erythema one inch in diameter surrounding the scarified area. He was not complaining of any symptoms. T. 98.8°, P. 100 per minute, R. 20 per minute. He remained under observation for one hour, halfway through which time he became cold and shivered slightly.

This state quickly passed off and the patient was allowed to leave. Subsequent interrogation revealed that the patient developed no further signs or symptoms.

From the above it will be seen that the female *Atrax* is just as liable to bite as the male, and that all *Atrax* bites are not necessarily serious or fatal.

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SUDDEN DEATH DUE TO A COMBINATION OF CARDIAC ANOMALIES.

By R. HAMILTON KENNY,
University of Sydney.

Clinical Record.

THE subject of this report was a male, aged nineteen years, physically sound and employed as a railway fireman. No family history was available. He brought a goods train about 100 miles, finishing at 12 midnight. He signed off duty, went to the railway sleeping quarters and about 1 a.m. went to the lavatory. He was found dead sitting on the pedestal at about 2 a.m.

Post-mortem examination by Dr. E. Trenerry disclosed no pathological changes save slightly increased congestion of the kidneys. Examination of the heart, however, showed the cause of death to be blood clot enclosed in a small fibrous bag completely blocking the right atrio-ventricular orifice.

Pathological Examination.

Through the kindness of Dr. A. H. Tebbutt, of Sydney, the heart was sent to the Department of Anatomy, University of Sydney.

The heart, hardened in formalin, appeared rather small, but well within normal limits. No abnormalities were detected in the left atrium and ventricle; the mitral

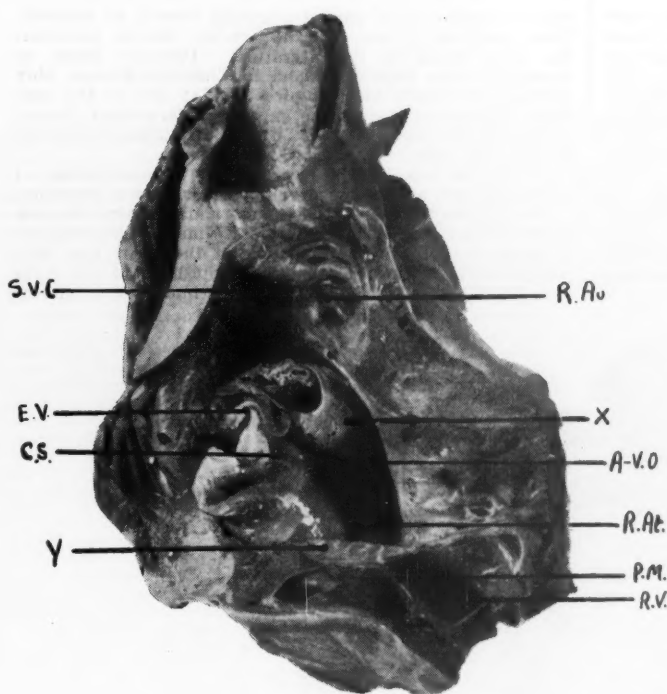


FIGURE I.

The interior of the right atrium and the lowest part of the right ventricle displayed by a longitudinal cut on the right side of the heart. A-V.O.: right atrio-ventricular opening. C.S.: opening of coronary sinus. E.V.: Eustachian valve. P.M.: papillary muscle attached to "A-V" membrane. R.Au.: right atrium. R.Au.: right auricle (auricular appendage). R.V.: lowest part, the "cul-de-sac" of the right ventricle. S.V.C.: superior vena cava. X.: the "string bag" network of Chiari. Y.: right "A-V" membrane (displaced inferior valve flap).

opening was 2.5 centimetres across and admitted the tips of two fingers.

The right atrium was in the normal position with normal auricle (auricular appendage), but rather dilated. The interior displayed the usual features of annulus and *fossa ovalis*, *crista terminalis*, *musculi pectinati* and entry of superior vena cava and coronary sinus (without an obvious Thebesian valve). There was an opening two millimetres in diameter in the upper part of the *fossa ovalis*.

The entry of the inferior vena cava was guarded by its valve (Eustachian), which was short, thin and fenestrated posteriorly. From the posterior half of its free edge arose four tendinous strands, exactly similar to *chorda tendinea*, which stretched 1.5 centimetres to the left into the atrial cavity and then branched and reunited to form a dense net.

The upper edge of this net was joined by the branches of a thicker tendinous strand coming from the atrial wall in the region of the inter-venous tubercle. The result was the formation of a small "string bag" ("X" in Figures I and II), approximately two centimetres in diameter, reaching 4.5 centimetres from the Eustachian valve. This was filled with dark blood clot, and was found plugged into the right atrio-ventricular opening ("A-V.O." in Figures I and III). It filled this opening and extended into the ventricle almost to the pulmonary conus.

To the left and in front of the Eustachian valve the antero-inferior part of the atrium was completely shut off from the lowest part

of the right ventricle by a thin pearly-white membrane ("Y" in Figures I and III). This was obviously a displaced valve flap, because it occupied the place where the lower half of the tricuspid opening should have been and was attached to the anterior and posterior ventricular walls by small papillary muscles.

Immediately above and to the left of this atrio-ventricular membrane, below the auricle, was the "A-V" opening, two centimetres in diameter and admitting only one finger.

The right ventricle was empty and collapsed and represented only the right half of the sterno-costal surface of the heart. The walls were thin—0.5 centimetre as compared with a left ventricular thickness of 2.3 centimetres—but had the usual trabeculation.

The cavity of the ventricle showed itself as a straight tube some 10 to 11 centimetres long by three centimetres in diameter, stretching diagonally from below on the right to the pulmonary conus above on the left (Figure III).

The lowest part of this tube was a cul-de-sac ("R-V" in Figures I and III), approximately four centimetres long, separated superiorly from the right atrium by the displaced valve flap already described.

Immediately above this the cavity of the ventricle was crossed at right angles by a thick broad band of muscle one centimetre in diameter which stretched from the junction of septal and anterior walls to the right wall ("A" in Figure III). The displaced valve flap was firmly adherent to the anterior surface of this muscular pillar, while the pillar itself formed the anterior and lower boundary of the "A-V" opening.

The "A-V" opening, more than five centimetres above the lowest part of the ventricle, was guarded by competent, well-formed anterior and posterior valve flaps stretching horizontally to the left. The anterior flap stretched

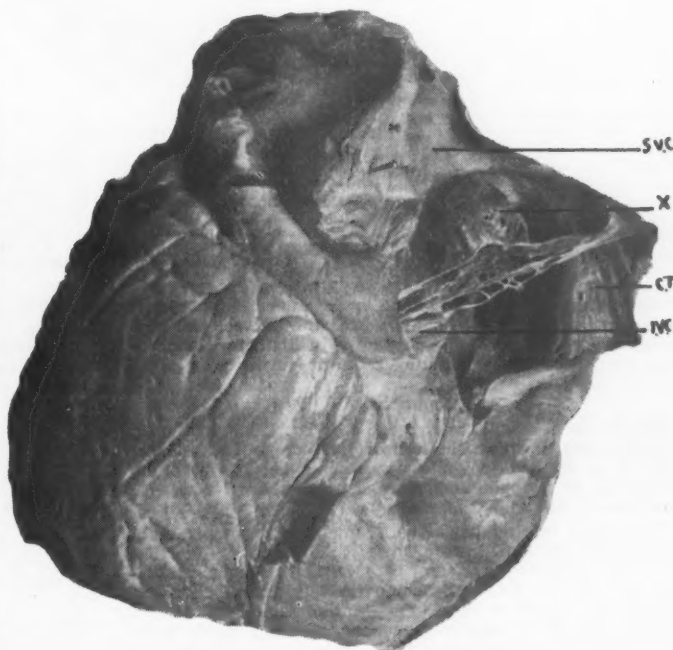


FIGURE II.

Interior of the right atrium from behind. C.T.: *crista terminalis*. I.V.C.: inferior vena cava. S.V.C.: superior vena cava. X: the "string bag" network of Chiari.

around the superior and inferior edges of the opening and was attached on the right to the pillar and adjacent wall, while the free margin was anchored by *chordæ tendineæ* to a small septal papilla and to the infundibulo-ventricular crest to the right of the pulmonary opening. The posterior flap was anchored direct to the septal wall and infundibulo-ventricular crest and attached to the margins of the "A-V" opening. It was continuous at its edges with the anterior valve flap.

Immediately above the "A-V" opening the posterior ventricular wall displayed the infundibulo-ventricular (supraventricular) crest ("Cr" in Figure III) as a prominent horizontal muscular ridge one centimetre thick forming a ledge immediately below the normal pulmonary valve cusps.

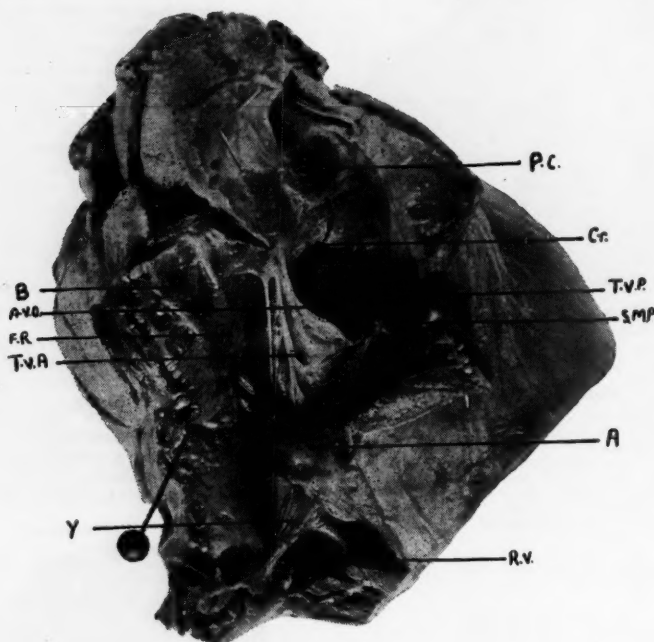


FIGURE III.

Interior of the right ventricle opened from the front. A: "pillar" of anterior papillary muscle. A-V.O.: right atrio-ventricular opening. B: wall of right ventricle turned aside. Cr.: infundibulo-ventricular crest. F.R.: right atrio-ventricular fibrous ring. P.C.: pulmonary valve cusps. R.V.: lowest part, the "cul-de-sac" of the right ventricle. S.M.P.: septal papillary muscle. T.V.A.: anterior flap tricuspid valve. T.V.P.: posterior flap tricuspid valve. Y: right "A-V" membrane (displaced inferior valve flap).

The pulmonary conus was smaller than normal, muscular tissue was present up to the level of the valves, and the pulmonary trunk was one centimetre in diameter, smaller than the 1.5 centimetre diameter of the aorta.

Comment.

The course of events, as suggested by Dr. Tebbutt, almost certainly was that first the network was damaged by being pinched or kinked in some way. This led to thrombus formation in the net and more or less sudden complete blockage of the "A-V" opening.

The atrial "string bag" is an unusually large example of the network named after Chiari (1897). This condition has been reviewed by Yater (1929) and Helwig (1932), and in all its forms is comparatively common, Yater finding it in 3.5% of cases. The authors point out that a Chiari network is usually innocuous, although liable to be the site of thrombus formation. It is considered to be a remnant of the right or right and left venous valves.

The "A-V" valve anomaly may be described as due to adherence of the inferior flap to the surrounding walls, and

may be classed as a partial tricuspid atresia or stenosis. This condition is rare and no exactly similar condition has been found in the literature. Partially fused or abnormal valve flaps are found in Ebstein's disease, ably reviewed by Yater and Shapiro (1937); but in the case under discussion there is no valvular enlargement, incompetence or displacement, nor is there any undue dilatation of the right side of the heart.

As far as can be discovered, such a combination of anomalies and events has never previously been described. The primary cause of these abnormalities must be considered to be genetic; but the precise mechanism involved is unknown. In the development of the heart the right venous valve is formed from the right horn of the *sinus venosus* (Odgers, 1935) at the same time as the inferior

tricuspid flap is formed from the right bulbar ridge (Odgers, 1939). These structures are close together and their development is extremely rapid; but in the present state of our knowledge it would be unjustifiable even to speculate on the genetic control of these structures.

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Reviews.

ARTERIAL HYPERTENSION.

THE isolated finding of arterial hypertension is not sufficient evidence on which to make the diagnosis of essential hypertension. Page and Corcoran, in this second edition of the book "Arterial Hypertension", point out that other indications of the disease must be sought before the clinician can be sure that increased arterial pressure represents a continued process with evidence of early arteriolar disease.¹

The book presents a clear exposition of our present views of a disease which every doctor meets daily in his practice. From an interpretation of the natural history of the disease it is their impression "that the most common progression of the disease is from prehypertension through neurogenic hypertension to establish essential hypertension with subsequent failure of vascular adaptation and in some patients the superimposition of the syndrome of malignant hypertension". They recognize the view that essential hypertension is a dominant trait, and is the cause of 90% to 95% of cases of arterial hypertension. But they point out an important finding made by Platt that hypertension, especially when severe and when it appears in persons under forty-five years of age who have no family history of hypertension, puts the probability about three to one in favour of renal origin.

There are chapters dealing with the physical examination and investigations required to evaluate the status of the patient, and the need for careful examination of the eye grounds is stressed. This book should be read by every general practitioner because the views expressed in regard to the treatment of the patient, his background as well as his disease, are sensible and weigh up very fairly the present trends in regard to specific measures of treatment such as the use of low salt diet, the rice diet of Kempner and the use of specific drugs such as thiocyanate, "Rutin" and vitamins A and E in the medical treatment of this disease.

The modes of action of sympathectomy in the treatment of hypertension are discussed and it is considered that an adequate sympathectomy is often followed by significant therapeutic results. The authors' experience with patients suffering from advancing vascular disease indicates that after three years, roughly 15% of patients are apparently cured, another 25% are symptomatically and objectively improved, 25% are symptomatically better, and the condition of the remainder is unchanged.

Appendices set out clearly methods for estimating renal function, the measurement of cardiac hypertrophy and details of the low sodium diet.

This is an excellent monograph and should be particularly acceptable to the physician for its critical analysis of this subject. To every doctor whose daily task it is to care for the hypertensive there will be useful information found in the pages of this book.

BLOOD TRANSFUSION.

THE authors of "Blood Transfusion" have attempted to provide a reference book suitable for transfusionists, supervisors of transfusion services and laboratory technicians.² It is intended primarily for use in the United States of America and includes the most recent advances in the specialty as practised in military and civilian life in that country.

As a result of the stimulus of the recent war, numerous papers concerning blood transfusion practice and technique have been published, and the authors have decided to restrict their bibliography to a judicious selection of the most important American contributions. There are comparatively few references to British literature, which is regrettable in view of the major part played by British workers in developing blood transfusion. A feature of the book is the 200 diagrammatic drawings, mainly covering

laboratory procedures. Details of blood grouping, for example, are illustrated by a finger dripping blood into a test tube, the appropriate mixture of cells and serum by a series of arrows and the fact that the tubes are centrifuged by an outline drawing of a centrifuge. These diagrams are perhaps helpful to the novice, but are unnecessary for the experienced worker who is endeavouring to use the book for reference purposes.

The section on clinical uses of blood and its derivatives is shorter than one would desire in a book with the aims listed by the authors, but nevertheless it contains much useful information. The chapter on blood groups is well written and includes a fair summary of the controversy concerning nomenclature which has been raging for some years. The section on storage of blood and the apparatus used for its collection and administration is comprehensive, but the methods described differ in many respects from those adopted in this country. The preparation of blood plasma is comprehensively discussed, but it is to be regretted that there has been such relatively brief mention of homologous serum hepatitis, a complication which is known to be causing considerable anxiety in the United States. A short section on the organization of community, regional and State blood services is interesting reading and helpful to any person proposing to establish a blood transfusion service.

In general the book is well written and well printed. Clinical considerations occupy too small a part of the discussion to allow the book to be recommended to the physician or surgeon desiring to administer an occasional blood transfusion, while the expert may find the form of the book over-simplified for his purposes. It would seem that the beginner and the laboratory technician will find the book most useful.

VISUAL DEVELOPMENT.

THE first volume of "Visual Development" by J. H. Prince is honoured with a foreword by Professor Hartridge.³ It is rather startling to read that Hartridge, who is so well known for his research on the physiology of vision, states in passing that: "It is usual to ascribe the red colour of the light which emerges from the eye during ophthalmoscopic examination of the retina to its blood supply."

The author's thesis appears to be that the eye has evolved from the crude organ of the lower animals to the magnificent visual apparatus of *Homo sapiens*. To illustrate his thesis, he dashed fifty thousand miles around the globe, observing, collecting material and opinions, and building castles in the air with breathless energy and speed. The onset of acute mental indigestion was inevitable, and the result is a volume comparable in style and accuracy with a "tabloid" newspaper.

In his preface the author gives as one of his main motives for publication, that of encouraging research into the problems of visual development. Such a racy account as his could not but kindle into a raging flame any spark glimmering in the breast of a "young man entering the optical and ophthalmological professions". Unfortunately, the taste for research, like adventure, is not to be acquired, and the dull dog who stays at home can only admire the energy which drives a Prince across the world almost as much as the enthusiasm which sustains a Kolmer and a Rochon Duvigneaud in a lifetime of research into the comparative anatomy of vision.

HOW YOUR BODY WORKS.

BOTH before and after he left Australia, Geoffrey H. Bourne has been well known for the various medical works he has produced, the latest of which is "How Your Body Works".⁴ The author has written this book to give young men and women leaving school a simple but complete physiological dissertation on bodily workings, and thus to fill a vital gap that is very often not covered in their school studies. Also he recommends medical students to study this book before they commence their physiology course at the university.

¹ "Arterial Hypertension: Its Diagnosis and Treatment", by Irving H. Page, M.D., and Arthur Curtis Corcoran, M.D.; 1949. Chicago: The Year Book Publishers, Incorporated. 8" x 5½", pp. 402, with 20 illustrations.

² "Blood Transfusion", by Elmer I. DeGowin, M.D., Robert C. Hardin, M.D., and John B. Alsever, M.D.; 1949. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 9" x 6", pp. 608, with 200 illustrations. Price: 63s.

³ "Visual Development", by J. H. Prince, F.R.M.S., F.Z.S., F.B.O.A., F.S.M.C., with a foreword by Professor H. Hartridge, M.A., M.D., Sc.D., M.R.C.P., F.R.S.; Volume I; 1949. Edinburgh: E. and S. Livingstone, Limited. 8½" x 5½", pp. 434, with 190 illustrations, some of them coloured. Price: 50s.

⁴ "How Your Body Works", by Geoffrey H. Bourne; 1949. London: Sigma Books, Limited. Sydney: Walter Standish and Sons. 8½" x 5½", pp. 248, with 91 illustrations. Price: 12s. 6d.

The book develops the subject from an historical background and is written in a very happy style, having a large number of anecdotes scattered throughout it, which make interesting reading. The introductory chapter outlines the growth of medical thought over its known extent and this is followed by a brief but complete chapter upon the microscopic anatomy of the body and then a dissertation upon the blood. Thereafter each chapter is devoted to the physiology of the various bodily systems and these are all illustrated with appropriate plates or sketches. The reproductive system is fully described and such complex factors as the chromosomes are simply elucidated; a short account is given of modern ideas on birth control. The mysteries of the ductless glands are explored and the complexities of the nervous system are capably dealt with, and in fact the whole book is well worth while and should be read by doctors, nurses and medical students.

PROGRESS IN PHYSIOLOGY.

"RECENT ADVANCES IN PHYSIOLOGY" by W. H. Newton reflects the changing times.¹ In the early days, "Recent Advances in Physiology" almost kept one up to date; Newton makes no pretence that the present volume does so. It is a series of essays by the author on the following subjects: "The Physical Basis of Temperature Regulation", "Water Diuresis", "Digestion", "Some Aspects of the Physiology of Pregnancy", "Blood Pressure and the Kidneys", "Catheterisation of the Heart", "The Electrical Excitation of Nerve", "Cutaneous Sensation", "Auditory Impulses", "Colour Vision".

Even in these essays the author does not pretend to a complete coverage of the literature. Nowadays there is no need for this; the card index type of reviews which appear in the "Annual Review of Physiology" serve this purpose. Newton's essays are, however, of a most valuable kind. He has selected what he believes (and we agree with him) are the crucial pieces of knowledge in each subject with which he deals. The relationship of these crucial pieces he analyses both in a qualitative and quantitative way. Indeed, this quantitative aspect of the book exemplifies the transitional stage of physiology from a qualitative description of the functions of the human body to a quantitative science.

The most valuable part of the book, however, is when the author sums up at the end of each chapter. There one finds a satisfying synthesis of present knowledge and an adumbration of future developments. Newton's recent death must give great sorrow; the present edition shows that he had reached a maturity which would have made him a most valued leader in scientific and clinical work.

EARLY CARCINOMA OF THE UTERINE CERVIX.

In the foreword of Wespil's monograph, "Early Carcinoma of the Uterine Cervix: Pathogenesis and Detection",² Walter Schiller remarks that "it is one of the great steps in progress of the last two decades that gynaecologists have become 'cervix minded'". This is undoubtedly true; that much more than "cervix mindedness", however, is required for the early detection of carcinoma is convincingly shown in this work, which represents Wespil's "views and concepts, his achievements and vast experience".

In the foreword Schiller summarizes the pros and cons of three methods of early cancer detection—the use of the colposcope, the iodine test, and the vaginal smear, and his chapter discussing often ill-understood pathological terms, like metaplasia, intraepithelial carcinoma, differentiation *et cetera* is particularly appropos.

To Hinselmann goes the credit for the introduction of colposcopy, its technique, concepts and nomenclature. In the first part of his book Wespil outlines its development, and discusses fully its peculiar terminology, coined to describe the clinical and histological pictures of every type of epithelium from normal to invasively malignant. A grasp of this is essential for the understanding of the clinical and

pathological descriptions in the many case histories presented.

In the second part detailed case histories show how in many macroscopically unsuspecting cases the routine use of the colposcope combined with Schiller's iodine test, applied to all gynaecological patients, led to the discovery, by biopsy or "Schiller's scraping" (a curetting of a small patch of epithelium) of pre-invasive or early invasive cancer.

The last part deals with the pathogenesis of malignant disease, with a detailed discussion of the relationships of the various types of cervical epithelium to carcinoma. Of interest are the cases demonstrating a long latent period, up to ten years, between the first evidence of intraepithelial malignant change and established invasion.

There is a splendid atlas of over seventy photomicrographs, repeated reference to which makes for a clear understanding of the text. Many are excellent sections of "border-line" cases, the interpretation of which varies with the experience of the pathologist. The bibliography is large, comprising papers chiefly of Continental and American authors.

The translation contains some quaint phrasing and punctuation.

This is a book as much for the gynaecologist, to whom it brings home his responsibility to his patient in the never-ending search for the symptomless early cancer, as for the practising pathologist and research oncologist.

ATLAS OF PERIPHERAL NERVE INJURIES.

THE evolution of new methods in peripheral nerve surgery must be determined by pathological study. Lyons and Woodhall lay emphasis on this in their review of peripheral nerve injuries, which is a detailed pathological study of material from a great many cases, arising out of World War II.¹ Approximately 13,000 peripheral nerve operations had been performed in neurosurgical centres up to September, 1945, and the review covers an adequate cross-section of this large number of cases. It is pointed out that the peripheral nerve registry had analysed 2050 cases of nerve suture and 67 nerve grafts. The authors write: "In the present publication no effort has been made to interpret in terms of personal opinion the facts demonstrated."

The volume is a clear-cut, beautifully illustrated statement of neuropathological fact, as it has become evident in the various phases of treatment which made the acquisition of specimens practicable. In 5382 cases the causative agent was a battle wound, and the general problems of associated soft tissue and bone injuries are briefly considered. It is noted that 4.5% of all peripheral nerve injuries were associated with soft tissue injury of sufficient severity to demand some type of plastic operation for the repair. Approximately 21.7% of all peripheral nerve injuries were associated with bone injuries of such a degree that the repair of both structures became a combined orthopaedic and neurosurgical problem. The value of coordinated efforts of specialists in all fields is stressed. Early repair is advised. The extreme friability of tissues immediately after injury is pointed out and the late histology illustrates the difficulty of immediate suture. After the lapse of two to three weeks suture of the membrane under slight tension is much more practicable. Adverse pathological changes are well established three months after the injury and after eighteen months in many cases the changes are not compatible with ultimate return of function. Tantalum sleeves appeared useful at times, a smooth glistening epineurial membrane being found beneath such wrappers. On the other hand, untempered and wrinkled foil became embodied in the epineurium, which showed a usual reaction to this added trauma and perhaps to the inert metal itself. Epineurium of nerve stumps wrapped in fibrin film assumed the consistency of dense tendon.

The volume is profusely illustrated with photomicrographs giving in atlas form a review of the many facets of repair phenomena. The authors expect to produce a companion volume at a later date in which end results of treatment will be correlated with pathology. For the present they should be congratulated on having produced a book in which the factual statements of pure pathology are not clouded by premature and unwarranted deductions and claims. The book should be read by all those interested in the scientific or surgical aspects of nerve repair.

¹ "Recent Advances in Physiology", by W. H. Newton, M.D., M.Sc. (Manchester), D.Sc. (London); Seventh Edition: 1949. London: J. and A. Churchill, Limited. 8" x 5", pp. 230, with 89 illustrations. Price: 21s.

² "Early Carcinoma of the Uterine Cervix: Pathogenesis and Detection"; revised and augmented edition by Hansjakob Wespil, M.D., translation by Marie Schiller, Ph.D., foreword and survey by Walter Schiller, M.D.; 1949. New York: Grune and Stratton, Incorporated. 8½" x 5½", pp. 282. Price: \$6.50.

¹ "Atlas of Peripheral Nerve Injuries", by William R. Lyons, Ph.D., and Barnes Woodhall, M.D.; 1949. London and Philadelphia: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 12½" x 9½", pp. 452, with 135 illustrations. Price: £1 12s. 6d.

The Medical Journal of Australia

SATURDAY, JULY 1, 1950.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

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Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

THE BRITISH COMMONWEALTH MEDICAL CONFERENCE.

THE second annual meeting of the British Commonwealth Medical Conference, held recently at Brisbane and reported in this issue, is the third gathering to be held under this title. The first was the inaugural meeting and was held at London in September, 1948: Australia was represented on that occasion by Dr. A. J. Collins and by the Editor of THE MEDICAL JOURNAL OF AUSTRALIA. The second gathering, the first annual meeting, was held at Saskatoon, Canada, and Australia was represented by Dr. J. G. Hunter, the General Secretary of the Federal Council of the British Medical Association in Australia. Most of the papers presented at the Saskatoon meeting were published in this journal. The third gathering, the second annual meeting, at Brisbane has come and gone, and was by common consent of all who were privileged to be present, acknowledged to have been of the greatest significance and value. The two Australian delegates, Dr. A. E. Lee and Dr. H. R. R. Grieve, made important contributions to the discussions and with Sir Victor Hurley and Dr. J. G. Hunter were able to present the Australian point of view in the many and varied discussions. The observers present were called upon occasionally by the Chairman when it seemed that they could amplify or complete an observation. It was noted with regret that Ceylon and Eire were not represented. Ceylon is a close neighbour to Australia and her delegate would have been particularly welcome. The delegates sent from Eire have endeared themselves to Australians by their personal qualities and their clear-sighted approach to subjects under discussion. The absence of delegates from Ceylon and Eire made necessary some adjustments in the financial arrangements for the meeting. This is shown in our report. There was a feeling of satisfaction that the adjustment helped to lighten the burden of Britain. Conferences of delegates from Commonwealth countries cannot be held without the spending of a good deal of money, and it is gratifying that no hesitation was shown in the decision to hold the third annual conference in South Africa next year. The conference will be held at

Johannesburg where the annual meeting of the British Medical Association is to be held concurrently with the annual meeting of the South African Medical Association. When discussion took place on the desirability of holding conferences every two years instead of every year some interesting statements were made. Dr. H. McPhedran said that it had been decided to hold a meeting in Brisbane as a test meeting to see how often meetings should be held in future. He spoke with enthusiasm of the benefits derived from meetings and he described the benefit as more spiritual, in the broad sense of the term, than factual. He found it difficult to explain this to his colleagues in Canada. After Dr. G. A. Jamieson had stated that careful consideration and great respect should be given to the point of view of the United Kingdom, Dr. A. Macrae said that the Council of the British Medical Association would like to meet in India as soon as possible. In India Branches of the Association had been dissolved and an affiliation was being worked out which was much on the lines of affiliation of the British Medical Association with the Canadian Medical Association and with the South African Medical Association. He thought that if an exception to the biennial plan was agreed to for 1951, a further exception might be agreed to for 1952 in regard to India. Dr. H. R. R. Grieve said that there seemed to be good reasons for the holding of meetings in each of the next two years. He held that at the moment the peoples of the British Commonwealth were so much an important part of the world and it was so important that they should speak with one voice, that there could not, with all the costs considered, be too frequent conferences. In regard to the letter received from the Pakistan Medical Association suggesting that the Conference might devise ways and means to enable the national medical associations of the Commonwealth countries to act as a single body in an emergency, the Conference exemplified the British genius for the rule of the unwritten law. It was Dr. T. C. Routley who said that, as a family, all members of the British Commonwealth would come to the aid of one of their number when necessity arose. As Dr. S. C. Sen and Sir Victor Hurley remarked, the Conference was not a permanent body and any help that was given to units of the Commonwealth would come from the World Health Organization and the World Medical Association.

From the list of formal papers presented to the Conference it will be seen that the overseas delegates were to be given as deep an insight as possible into the Australian medical *ménage*, and as a matter of fact this method of approach served a double purpose—it enabled Australia as host of the meeting to follow the examples of England and Canada in the first two conferences and the individual papers served as a good *point d'appui* for the general discussion. With the subject matter of many of the papers readers of this journal are, or should be, familiar. The contribution of Sir Earle Page was in a somewhat different category from the others and will be read with interest by Australian practitioners. It was presented also to the meeting of the Federal Council which followed immediately on the British Commonwealth Medical Conference. Since matters arising in connexion with it were discussed at the Federal Council meeting it will be published as part of the report of that meeting rather than with the Conference report. Special mention must be made of Dr. G. Simpson's paper on the Flying Doctor

Service. Dr. Simpson had a story of the most absorbing interest to tell and he told it with the aid of pictures and apparatus in an effective way. He had with him the Very Reverend John Flynn, who first conceived the idea of the service, and Dr. Alan Vickers. All three speakers captured the imagination of the overseas visitors and they had the appreciation and gratitude of everyone present.

How then can we sum up the impression produced by the Brisbane Conference? Dr. W. F. Simmons, at the end of his paper on the organization of the medical profession in Australia, struck the right note when he said that the medical profession in Australia was successfully organized, but that the organization was, and should be regarded as, one unit in the organization of the medical profession of the British Commonwealth of Nations. The Brisbane Conference was, Dr. Simmons said, an expression of our striving for unity. But we can go further than this. Dr. H. McPhedran expressed the central idea that pervaded the Conference when he said that the British Commonwealth of Nations, by and large, was still the greatest political and military factor for peace in the world and that the medical profession had a great part to play in that sphere. Medicine is not alone in the role it has assumed. There come to mind the four Commonwealth Relations Conferences which have been held. The last took place in September, 1949, and was held at Bigwin Inn, Ontario, Canada. Before that similar Commonwealth Relations Conferences were held at Lapstone, near Sydney, in 1938, and at Toronto, Canada, in 1933. At the Bigwin Inn conference emphasis was laid on the value of the unofficial interchange of views. It was also declared that the success of ventures in international collaboration depended upon absolute respect for the independence of thought and action of the constituent members. At the Commonwealth Relations Conferences such matters as economic problems, problems of security, colonial policies and racial problems are discussed. These conferences, in their unofficial set-up, do much to cement intra-Commonwealth relationships and to promote understanding between all English-speaking nations. We of the British Commonwealth naturally look to the United Kingdom as our head and inspiration. Walt Whitman, in one of his "Pictures", wrote:

... the master appears advancing—his form shows above the crowd, a head taller than they,

His gait is erect, calm and dignified—his features are colossal—he is old, yet his forehead has no wrinkles,

Wisdom undisturbed, self-respect, fortitude unshaken are in his expression, his personality.

We might apply this description to the Old Country. But Britain does not assume the role of Grand Master to exact homage from satellites. John Coatman has written recently in "The British Family of Nations" as follows:¹

We have seen young growing nations finding scope and protection for growth inside a great political system, with the most politically experienced and most truly democratic nation in the world as its centre and mainstay; a union which lasts only as long as membership of it means perfect freedom for all its parts. Its principles of action are cooperation through agreement and consultation, the very principles which the United Nations Organization are seeking now to establish.

We know the old saw that union is strength. We strive for unity, but we know that this does not imply uniformity. We need no "tangible bonds of union", for we remember

that ties "light as air" may still be "strong as links of iron". It is bonds such as these which are forged when doctors from the different units of the British Commonwealth meet together to learn and appreciate problems, to discover how one or another has surmounted difficulty and to gain courage and give it.

Current Comment.

ANTIBIOTICS IN THE TREATMENT OF TYPHOID FEVER.

ALTHOUGH typhoid fever is not a common disease in most well-ordered groups of society, it is always a potential danger when a slip in hygiene occurs. One carrier may initiate an epidemic involving hundreds of people, as Australian experience has shown. Attention has frequently been called to the great promise of certain antibiotics in treatment, but, fortunately, large series of cases are not often seen, and knowledge has had to grow by slow accretion. An investigation has been carried out in Guadalajara in Mexico, where in a population of 300,000 no less than 150 persons contract typhoid fever each year. V. Knight, F. R. Sanchez, A. R. Sanchez, S. Shultz and W. McDermott worked as a team on a therapeutic project conducted jointly by the University of Guadalajara and Cornell University Medical College with the New York Hospital.¹ They studied the effects of three drugs, polymixin B, aureomycin and chloramphenicol. Most of the patients were cared for in hospital, but some refused to leave home, and were studied there. The overall mortality rate in Guadalajara has been about 10% in the past. At the outset it was decided to treat patients with polymixin B or aureomycin, the choice of drug being made by chance. Control groups were obtained by collecting data of patients treated by previous conventional methods before the research began; some of the patients were in Mexico and others in New York. The plan of the inquiry was changed early, owing to the occurrence of severe toxic symptoms in the patients treated with polymixin B. Only four patients were treated with this substance, and it was felt that the circulatory depression which followed its use precluded further experiment. There was no sign of benefit which appeared to be related to the drug. Accordingly the remainder of the series of 51 patients were treated with aureomycin and chloramphenicol, 34 with the former antibiotic and 13 with the latter. The aureomycin was administered by mouth for six to ten days. Two patients died from intestinal complications. The others recovered, 31 out of the series without complication. The average time of stay in hospital was reduced also, but it was not always possible to state definitely that the drug produced an important change in condition. Improvement occurred in some cases, only to be followed by a relapse later. In others the general condition improved, but fever persisted. The state of all these patients was described at the outset as that of an acute or grave illness. Studies were made of the immune mechanisms and of the presence or absence of bacteremia. The latter is not very helpful in the evaluation of progress, since the organisms do not necessarily persist in the peripheral blood even in untreated patients.

Quite a different picture was seen in the patients treated with chloramphenicol, even if we allow for the smaller size of the series, 13 in all. They were all given the drug by mouth for a period of seven to ten days, and were all acutely ill at the beginning of treatment. The pattern of recovery was so striking and so uniform that it must surely be directly related to the drug. No improvement could be discerned during the first forty-eight hours, but during the succeeding twenty-four hours the temperature dropped, delirium disappeared, the characteristic abdominal signs vanished, and the improvement in the

¹ Quoted in *The Times Literary Supplement*, May 5, 1950, page 271.

¹ *Archives of Internal Medicine*, January, 1950.

general condition reminded the authors of the familiar crisis in lobar pneumonia. However, clinical and bacteriological relapse occurred in four of the thirteen cases. It is interesting that the incidence of relapse was comparable with that observed in the patients who received aureomycin, and also those in the control series, who received no specific treatment. Perhaps this might be expected, for it seems that in spite of specific drug treatment of diseases with such immunological peculiarities, the building up of active resistance is the patient's own affair, a precautionary measure of Nature which is accomplished in the fullness of time. When relapse occurred the treatment was resumed, and the course of events was exactly the same as in the first instance. Though the disappearance of bacteria from the blood has been pointed out above as a variable phenomenon, it should be noted that it occurred promptly in patients who were given chloramphenicol, the contrast with those given aureomycin being too striking to be due to chance. No relation could be established in either series between the presence of bacteria in the blood and the rise of titre of antibody. No toxic effect was observed with either drug. The authors have interestingly discussed a number of questions concerning dosage and intensity of treatment, but here it is sufficient to conclude by drawing attention to their observation that parallel studies of these two antibiotics in brucellosis and rickettsial infections have not shown such superiority of chloramphenicol over aureomycin; this appears to be virtually unique to typhoid fever.

DEOXYCORTONE, ASCORBIC ACID AND RHEUMATOID ARTHRITIS.

It seems desirable at this stage to add yet another comment to the two previous references in these columns (on January 28 and March 18, 1950) to the treatment of rheumatoid arthritis with deoxycortone acetate and ascorbic acid. The method, first put forward by Lewin and Wassén, aroused much interest, particularly as it was announced soon after the work of Hench *et alii* on "Cortisone", and has been subjected to intensive, if relatively brief, examination by many workers prominent in this field. The most recent, and therefore probably most considered, reports offer it practically no support. J. P. Currie and George Will,¹ from the Glasgow Royal Infirmary, report that among 17 patients treated, none showed significant objective improvement and only two reported subjective improvement; these two also reported subjective improvement after each of three injections of saline solution substituted without their knowledge for the deoxycortone and vitamin C preparations. A group of 12 workers, headed by W. S. C. Copeman, working under the auspices of the Empire Rheumatism Council,² have used the treatment in a total of 172 cases; "some limited improvement" was noted in 14 cases (subjective only in 11 and objective in three). Every member of this group of investigators, it is stated, has had experience in the assessment of "cures" in rheumatoid arthritis, and many have treated patients with adrenocorticotrophic hormone; they have unanimously found treatment with deoxycortone acetate and ascorbic acid to be of no significant benefit in rheumatoid arthritis, and state that with adequate control and standardized conditions, it produces no more improvement either subjectively or objectively than can be observed to follow other forms of injection treatment, such as with procaine or even normal saline. E. G. L. Bywaters, A. St. J. Dixon and J. B. Wild,³ after failure to observe any obvious bedside improvement from the treatment, made a carefully controlled investigation of ten patients, with statistical analysis of some of the responses. They, too, found that it had "no immediate measurable or appreciable effect on rheumatoid arthritis beyond that which follows any non-specific injection or treatment", and that it was in no way comparable with adrenocorticotrophic hormone.

These negative findings, following on the enthusiastic earlier reports, are disappointing and would be disturbing if we were not already familiar with the fallacies associated with the introduction of nearly any new therapeutic régime. Various explanations have been offered for the widely differing results—differences in technique of treatment and of assessment of objective effects, an alleged subjective exhilarating effect, and so on—but Currie and Will rightly draw attention to the frequency in rheumatoid arthritis of spontaneous remissions, usually subjective and of variable duration. Further, they divide patients with rheumatoid arthritis into two broad groups; those who accept their disability as incurable, with the attitude of mind aptly described by the phrase "What can't be changed must be tholed", and those who refuse to yield to their affliction and struggle on with their work and recreations in spite of their disability; in these workers' experience symptomatic improvement with any form of treatment is extremely common—at least temporarily—in the second group. It does not seem that the supporters of this new form of treatment have proved their case.

HÆMOPHILIA IN ONE OF APPARENTLY IDENTICAL TWINS.

THE recent reporting of hæmophilia occurring in one of apparently identical twin boys offers a nice little problem to the geneticists. The facts, as presented by A. J. Quick and J. P. Conway,¹ seem to provide little room for argument. All the evidence supports the idea that the boys, who were born in March, 1942, are monozygotic twins: their blood types are exactly the same; they are very similar in appearance; the colour of their eyes and shade of their hair are identical and even the type and location of the whorls of their hair completely match; their fingerprints are similar, but require further study; the mother remembers being told that there was only one placenta when they were born. The only apparent difference is that one is a "bleeder", a typical hæmophilic, and the other is normal. This one difference is, however, enough to raise a knotty problem in the light of the well-known hereditary character of hæmophilia, which is commonly quoted as a classical example of the transmission of a characteristic by a sex-linked recessive gene. No family history of bleeding has been found, but the diagnosis appears to be in no doubt. According to the authors—and Quick is no mean authority on such matters—the most modern diagnostic criteria are satisfied. By all the normal rules, an hereditary character of this type should be shared by monozygotic twins, as these boys appear to be. The simplest explanation to fit all these facts would be, as Quick and Conway point out, to postulate a mutation in the affected twin and class him as a sporadic hæmophilic. They are very cautious about accepting this solution, in view of "the insidious hereditary pattern of the disease" and the fact that "its diagnosis was never conclusive until the development of recent methods". Geneticists, however, do recognize the appearance of hæmophilia in a family as a result of a spontaneous mutation. H. Kalmus, in his book "Genetics" (Pelican Books, 1948), quotes the famous case of Queen Victoria, who had no hæmophilic ancestors but handed the condition on to the former Russian and Spanish dynasties through her daughters, though not to the reigning English house; the mutation must, Kalmus considers, have arisen in her body or in the gonads of either of her parents. If this explanation of the phenomenon of the hæmophilic twin is not accepted, another is not immediately apparent; Quick and Conway do not attempt to offer a final solution. Perhaps they are right in not accepting a hasty solution merely because it fits in with certain previous conceptions. They have merely reported the facts "since with the accumulation of such diverse findings more light may be shed on the peculiarities of inheritance".

¹ The Lancet, April 15, 1950.

² Ibidem, April 29, 1950.

³ Ibidem, May 20, 1950.

¹ The American Journal of Medicine, December, 1949.

Abstracts from Medical Literature.

BACTERIOLOGY AND IMMUNOLOGY.

Pulmonary Oedema in Influenzal Pneumonia.

CARL G. HARFORD AND MARY HARA (*The Journal of Experimental Medicine*, October, 1950) have studied pulmonary oedema in influenzal pneumonia of the mouse and the relation of fluid in the lung to the inception of pneumococcal pneumonia. They state that previous work had established a relationship between the virus lesion and susceptibility of the animal to secondary infection. Microscopic studies of the virus lesions produced by intrabronchial inoculation showed the development of pronounced oedema after five days, and this was the shortest period of time after which susceptibility to coccal infection could be demonstrated. The inhaled cocci appeared to grow in the oedema fluid, which acted as a culture medium for them, before the migration of leucocytes into the fluid could exert phagocytic action. Mice inhaling pneumococci, without the previous exhibition of virus in order to produce oedema, developed pneumococcal septicaemia, and did not have pulmonary oedema. The authors point out that human patients with conditions such as congestive heart failure, which produce pulmonary oedema by causes other than virus infection, also have a special liability to pneumococcal pneumonia; they recall that pulmonary oedema is common in cases of pandemic influenza, in which there is also a high mortality from associated pneumococcal pneumonia.

Serum Proteins in Infectious Mononucleosis.

KENNETH STERLING (*The Journal of Clinical Investigation*, September, 1949) has made electrophoretic studies of the serum proteins in infectious mononucleosis, in extension of observations on abnormal results from liver tests and heterophile antibodies in that disease. The electrophoretic analysis revealed a diminution of the albumin fraction and an increase of the γ globulin, with some irregularities of the α and β globulins. Separation of the fractions and testing of them with sheep red cells showed that the heterophile antibody was contained chiefly in the γ globulin fraction, though some activity could be shown in the α and β fractions.

Genetic Character of the O-D Change in Influenza A.

F. M. BURNET, JOYCE D. STONE, A. ISAACS AND MARGARET EDNEY (*The British Journal of Experimental Pathology*, October, 1949) have studied the genetic characters of the O-D change in influenza A virus. They state that first isolations of virus carried out in the amniotic cavity may yield fluid which will not agglutinate fowl cells, but will agglutinate guinea-pig or human cells in conformity with the infective titre of the fluid. This character has been preserved by transfer in the amniotic cavity of limiting dilutions of the fluid, by careful atten-

tion to the technique described in the authors' laboratory. However, the D form, which agglutinates fowl cells to titre, always appears if the conditions are not exactly complied with. Attempts were made to induce the O-D change by variations of temperature or by treatment of red cells with periodate, and so to produce agglutination of the fowl cells by the O phase virus. This was not achieved, and the authors believe that the appearance of the D phase virus is due to a selection and survival of a genetic mutant of the O phase virus in the chick embryo lung, and not, as was suggested by Magill and Suggs, merely a change produced at will by altering the ionic environment of the virus.

Virulence of Tubercle Bacilli.

HUBERT BLOCH (*The Journal of Experimental Medicine*, February, 1950) initiated studies on the virulence of tubercle bacilli with a record of the isolation and biological properties of a constituent of virulent organisms. He states that this idea grew from the recent discussion of Dubos and Middlebrook on the significance of the "cord" formation exhibited by virulent and not by avirulent tubercle bacilli when grown in fluid media, and from the observation that this cord formation could be abolished by suspending the wet tubercle bacilli in paraffin oil. The author pursued the possibility that cord formation must be due to some property of the surface of the virulent bacilli which could be disturbed from the surface of the organisms by the paraffin. Large amounts of wet tubercle bacilli were collected by filtration from young liquid cultures and extracted three times with petroleum ether. By a careful process of alcohol precipitation it was possible to obtain from the petroleum ether a very small amount of a waxy, amorphous, colourless substance with a melting point of 30° to 31° C. It was soluble in petroleum ether, paraffin, chloroform and benzene, insoluble in ethanol, methanol, acetone and water. It was acid fast. Its analysis showed a composition of 79.5% of carbon, 13.3% of hydrogen, 0.6% of nitrogen and no phosphorus. Biological tests showed that by the technique of leucocyte migration on a plasma gel, the addition of this substance to avirulent tubercle bacilli enabled them to behave as virulent ones. The coating of *Bacillus subtilis* with the substance now known as "cord factor" also enabled them to exhibit the same behaviour as virulent tubercle bacilli. Cord factor was tested for toxicity in three strains of mice. A single intraperitoneal injection produced no effect in any mice. Repeated injections caused death of some animals, and the susceptibility paralleled the susceptibility of the animals to living tubercle bacilli. The dead animals had lost weight, and had haemorrhages in the lungs. Similar extracts were prepared from *Mycobacterium phlei*, *Mycobacterium smegmatis*, *Bacillus Calmette-Guérin* and avirulent tubercle bacilli, and the experiments on leucocyte migration repeated. An extract of moderate potency was obtained from the *Bacillus Calmette-Guérin* culture, but not from any of the other organisms tested. The possibility of a relationship between cord factor and tuberculin reactivity was explored, but no reaction was obtained to tuberculin in animals which had been treated with cord

factor and allowed to wait for two weeks. Bacteria from which the petroleum ether extract had been prepared were still viable, and if placed in suitable culture medium would grow out; they still retained their original virulence for guinea-pigs, and still were capable of producing further cord factor. Several aspects of the work are still in progress, and communications will appear in due course.

Antibiotics Active Against Bacterial Viruses.

I. N. ASHESHOV, FRIEDA STRELITZ AND ELIZABETH A. HALL (*The British Journal of Experimental Pathology*, June, 1949) have investigated antibiotics active against bacterial viruses. They have developed a technique of inoculating agar plates with a mixture of an organism and its corresponding bacteriophage, and then adding on a paper disk, after the method of Florey, culture filtrates suspected of containing antibiotic substances. If these are directed against the bacterium or against the phage, varying effects can be produced; in the latter instance the "clearing" phenomenon usually denoting the presence of phage is inhibited, and the organism will grow. Thus the bacteriophage serves as the prototype of the virus, and the bacterium of its host. The mould which has shown considerable activity is a species of *Aspergillus*, and by treatment of culture filtrates obtained at different periods of growth by different methods of extraction, at least five substances showing antibiotic activity have been found. Three were active against bacteria only, one against streptophages, and one against staphylophage. Experiments have been devised to test the manner of action of these substances, and no evidence has been found to indicate that they affect the bacterial surface in any way, or that their action depends on the number or type of bacteria used. However, when variation of the stage of development of the bacteriophage was studied, it was found that the recently liberated phage particle was slowed in its attack and multiplication within a new host cell. The authors point out that their material was crude, which might alter results obtained with pure substances, but believe that this technique may add to the existing knowledge of the two interdependent variables, the living bacteria and their parasites, bacteriophage.

Production of B.C.G. Vaccine.

RENE J. DUBOS AND FRANK FENNER (*The Journal of Experimental Medicine*, March, 1950) have studied the production of B.C.G. vaccine in a liquid medium containing "Tween 80" and a soluble fraction of human serum. They state that in view of our ignorance of the mechanism of tuberculosis immunity, the problem of adequate criteria for the standardization of living attenuated cultures of bovine tubercle bacilli to be used for vaccinating human beings remains also unsolved. Some factors in production of the vaccine, however, can be controlled, such as the numbers of viable cells and their physiological activity, and the level of attenuation of the culture, although it is likely that the final product varies considerably. The present work was undertaken to eliminate some of the chance factors in preparation. The development of a

simple synthetic medium containing a wetting agent, "Tween 80", eliminated the necessity for grinding up pellicles of growth, and the use of a soluble fraction of human serum as enrichment got rid of the use of animal protein which might be antigenic in the human subject. Human serum diluted with an equal amount of saline was acidified and heated to 65° to 70° C. for twenty minutes. This causes precipitation of the denatured globulins and leaves a soluble fraction of albumin, which can be sterilized by filtration and added in 5% concentration to the medium. Glucose or glycerin was not used, as it was shown that they interfered with the viability of the cultures when stored. After one week's growth in this medium, B.C.G. cultures show a fine dispersed sediment, which forms a relatively homogeneous suspension on shaking. Colony counts over a period of six weeks' storage showed that a large amount of the cells remained viable, more than in cultures prepared in the ordinary way.

The same authors (*ibidem*) studied the antigenicity of these cultures of B.C.G. after varying periods of storage. Carefully selected guinea-pigs were kept under standard conditions, and proved to be "tuberculin-negative" at the beginning of the experiments. They were injected with varying amounts of the test cultures, and controls were given similar amounts of standard B.C.G. vaccine. The number of viable units in each dose was controlled by colony counts of similar amounts of the inoculum. Five to six weeks later the animals were tested for their reaction to tuberculin, and then were challenged with virulent tubercle bacilli. The results showed that the test cultures consistently produced larger local lesions and more necrosis than the similar amount of standard vaccine, and this appeared to be due to the larger number of viable bacilli present. All animals showed strong reactions to the intracutaneous tuberculin test, and it was found that a response to the tuberculin test could be achieved with so small an amount as that culture dilution which contained only 10 viable units of B.C.G. as shown by colony counts. The challenged animals showed a high degree of resistance to subcutaneous infection with virulent tubercle bacilli.

HYGIENE.

The Toxic Action of Chlordan.

E. F. STOHLMAN, W. THORPE AND M. SMITH (*Archives of Industrial Hygiene and Occupational Medicine*, January, 1950) have made a study of the toxicity and pathological effects of chlordan on animals. Chlordan is a chlorinated hydrocarbon compound ($C_{10}H_6Cl_4$) which has been found to be effective in controlling various species of insects. The authors state that the acute toxicity of chlordan is somewhat lower than that of DDT when the compounds are fed to rats in their diet. The acute toxicity of these two compounds is about the same when they are fed to rabbits. Death from chlordan poisoning when it is given by mouth may be delayed for many days. The chronic toxicity of chlordan is considerably greater than that of DDT in both rats and rabbits. This appears to be due

to a greater cumulative action of chlordan. Like DDT, chlordan when administered continuously to rabbits causes focal necrosis of the liver and congestion, oedema and exudate in the lungs. In addition chlordan produces degenerative changes in the intestinal submucosa and in the convoluted tubules of the kidneys. Organically bound chlorine is excreted in the urine of rabbits receiving chlordan orally. The chlorine test is not specific for chlordan, but in the absence of other chlorinated organic compounds it may be used as an aid in the diagnosis of chlordan poisoning, or in the control of incipient poisoning under continued chlordan exposure. In DDT poisoning the barbiturates, especially urethane, are effective antidotes in tiding the animal over the short critical period of severe involvement of the nervous system. The effect of the barbiturates in chlordan poisoning was not determined.

The Brucella Ring Test.

A. V. HAMILTON AND A. V. HARDY (*American Journal of Public Health and The Nation's Health*, March, 1950) discuss the value of the brucella ring test in the control of brucellosis. The test depends on the fact that in whole milk agglutinated brucellae adhere to the fat globules and are carried to the surface of the milk as the cream rises. When a stained antigen is used, a positive result is indicated by a coloured cream ring at the surface of the milk. In a negative result the cream ring is uncoloured and the milk is coloured. The test is simple to perform and is less expensive than the agglutination test on the animal's blood or on milk whey. It is comparatively sensitive and can be used to test mixed samples of milk to detect infected herds. The authors consider that it could be used as a screen test and that it would be effective if the milk from each cow or each can was tested. It would be less effective if the mixed milk from herds was tested. It should be of value in helping to improve the safety of milk which cannot, for various reasons, be pasteurized.

Infection of Household Associates of Tuberculous Subjects.

W. R. AMES AND H. C. MILES (*American Journal of Public Health and The Nation's Health*, February, 1950) have investigated the records of a group of 432 household associates of "sputum-positive" subjects of tuberculosis over an eighteen-year period in Cattaraugus County, New York. They state that during this period there has been a steady decrease in the proportion of this group that yields a positive result to the tuberculin test; it has declined from 78.5% in the first six-year period to 50.9% in the last six-year period. The proportion yielding a positive result to the tuberculin test varies with certain characteristics in the index cases, being higher for associates of women, of young persons and of people with advanced disease, and in situations in which exposure is prolonged. Any alteration in any of these factors will have an influence on the average probability of infection among the contacts. The distribution of household associates of persons with tuberculosis has changed over the eighteen-year period. With the exception of the "long exposure" group, association with each of the above categories of patients was

less in the latter part of the eighteen years. This change has been brought about by a number of factors. A shift in the age-sex distribution of cases has occurred, a greater proportion of elderly males being infected. Early diagnosis has resulted in an increase in the proportion of minimal cases. In diagnosed cases the patients are now given more prolonged treatment in hospital. The authors suggest that a general decline in tuberculous infection may have taken place among such associates largely because of changes in the characteristics of the tuberculous patients themselves.

Multiphasic "Screening" Examinations.

L. BRESLOW (*American Journal of Public Health and The Nation's Health*, March, 1950) suggests that when a population group is surveyed for the presence of one disease, the survey should include a search for as many other diseases as is administratively possible. Public health workers have now extended their field of operation from infectious diseases to the control of the chronic diseases which have become major causes of morbidity and mortality. Early detection, early diagnosis, and adequate treatment can often prevent the further development of disease processes. This fundamental concept of preventive medicine has promoted the idea of periodic health examinations. These are limited for mass surveys on account of the time taken, the staff required and the expense involved. Detection of disease by mass "screening" technique is a different approach. Mass photofluorographic X-ray examinations of chests for the detection of early signs of tuberculosis have been carried out. Mass blood examinations for syphilis and mass urine examinations for diabetes have been carried out in America. Similarly mass survey procedures have been suggested for the detection of heart disease, renal disease, cancer of the uterus and bronchogenic carcinoma. The author suggests the combination of all these procedures in a multiphasic "screening" examination. The advantages of such an examination are numerous. The individual undergoes an examination covering a number of diseases in about the same time as it took previously for one disease. Before the survey the administrative agency requires to conduct only one health-education programme to cover a number of diseases. The same statistical system is required for a multiple "screening" procedure as for a single "screening". Laboratory investigations and follow-up examinations can be simplified. A trial survey was carried out by various health organizations in California last year. The survey included examination with a miniature chest X-ray film, a urine test for albumin and sugar, and a blood examination for sugar content and syphilis reactions. A brief history was recorded on a card. Among 945 persons 29 cases of disease were found; in 13 of these the patients were not aware that they had the disease. The author discusses the training of physicians and technicians in the procedures involved, the problem of "following-up" cases of disease detected, the relationship of the survey to other professional organizations, and the age and sex groups in which the greatest returns may be expected.

Special Article.

HÆMOGLOBINOMETRY.

MEASUREMENT of the concentration of hæmoglobin in blood is one of the investigations most frequently performed in a pathological laboratory. Many factors affect this concentration in the blood of a healthy human subject. The influence of factors such as age and sex is better known than that of other intrinsic and extrinsic factors. Knowledge of the relative importance of the different factors is still incomplete and more information is being collected. In the meantime a preliminary agreement on the values of average hæmoglobin concentration in the blood of healthy adults is essential to hæmatologists for interpretation and comparison of their results. It may be noted that the findings in Australia are in general agreement with those arrived at in other countries.

The Section of Pathology of the New South Wales Branch of the British Medical Association has been aware of the difficulties and problems of hæmoglobinometry for some time. It appointed a subcommittee on hæmoglobin which has had many meetings to discuss data and methods. As a result of its deliberations the subcommittee submitted several recommendations which were approved by the Section. These recommendations are substantially as follows:

The concentration of hæmoglobin should be expressed as grammes per 100 millilitres of blood and not as percentage of "normal" values. The actual value of 100% given by various hæmoglobinometers may range from 13.8 to 17.3 grammes per 100 millilitres. It is essential to check whether the results given by any hæmoglobinometer in terms of grammes of hæmoglobin per 100 millilitres of blood are correct when the instrument is used according to instructions. The National Standards Laboratory of the Commonwealth Scientific and Industrial Research Organization will examine and calibrate hæmoglobinometers or supply samples of blood of determined hæmoglobin concentration by which pathologists may themselves check their instruments. Pathologists are urged to make regular use of this service in order to eliminate the largest systematic error in hæmoglobinometry. It is necessary to emphasize that even a calibrated instrument will not give accurate results if it is not properly used. Inaccurate results may be obtained if errors are made in sampling or diluting, if other tubes or cells are substituted for those with which the calibration was carried out, if essential parts of the instrument are dirty, or if the electrical, illuminating or any other part of the apparatus is faulty.

For healthy men the average hæmoglobin concentration should be taken as 15.5 grammes per 100 millilitres of blood, and the average red cell count as 5.2 million per cubic millimetre of blood.

Sufficient information is not yet available for a reliable statement of the average hæmoglobin value for healthy women. Pending further investigation it is recommended that the figure be taken as 13.8 grammes per 100 millilitres of blood and the average red cell count as 4.6 million per cubic millimetre.

Normal variations cannot yet be defined precisely. A greater and more variable demand for iron by women, owing to losses in menstruation and to pregnancy, may cause a greater variation of hæmoglobin concentration than in men.

Determinations of hæmoglobin should be made on fixed dilutions of blood and the intensity of colour of the hæmoglobin derivative used should be measured by visual or photoelectric methods. Any standard used should be in the form of a suitable glass plate or wedge.

The colour index should be calculated by dividing the number of grammes of hæmoglobin in 100 millilitres of blood by three times the red cell count in millions per cubic millimetre. This corresponds to a mean corpuscular hæmoglobin of 30×10^{-12} grammes.

While some of these recommendations are tentative because of the incompleteness of the data on which they are based, they should form a useful guide to hæmatologists and pathologists.

DOUGLAS REYE,

Secretary, Section of Pathology,
New South Wales Branch of the
British Medical Association.

British Commonwealth Medical Conference.

SECOND ANNUAL MEETING.

THE second annual meeting of the British Commonwealth Medical Conference was held in the Choral Room of Lennon's Hotel, Brisbane, on May 23, 24 and 25, 1950.

The officers of the conference were:

Chairman.—Sir Victor Hurley, President, British Commonwealth Medical Conference, and President, Federal Council of the British Medical Association in Australia.

Deputy Honorary Secretary-Treasurer.—Dr. A. Macrae, Deputy Secretary, British Medical Association (deputizing for Dr. Charles Hill).

Local Organizing Secretary.—Dr. J. G. Hunter, General Secretary, Federal Council of the British Medical Association in Australia.

The delegates present were:

Australia.—Dr. H. R. R. Grieve, member of the Federal Council of the British Medical Association in Australia, Undercliffe, Sydney, New South Wales; Dr. A. E. Lee, member of the Federal Council of the British Medical Association in Australia, Wickham Terrace, Brisbane, Queensland.

Canada.—Dr. Harris McPhedran, Chairman of General Council, Canadian Medical Association, Medical Arts Building, Toronto 5, Ontario; Dr. T. C. Routley, General Secretary, Canadian Medical Association, 135 St. Clair Avenue, West, Toronto 5, Ontario.

Great Britain.—Dr. E. A. Gregg, Chairman of Council, British Medical Association, Tavistock Square, London, W.C.1, England.

India.—Dr. S. C. Sen, Honorary Secretary, Indian Medical Association, 1 Barakhamba Road, New Delhi, India.

New Zealand.—H. K. Pacy, Esquire, F.R.C.S., Honorary General Secretary, British Medical Association, New Zealand Branch, Box 156, Wellington, New Zealand.

Pakistan.—Dr. N. Ahmed, President, Pakistan Medical Association, Chittagong, East Pakistan.

South Africa.—Dr. A. H. Tonkin, Medical Secretary, Medical Association of South Africa, 35 Wale Street, Cape Town, South Africa.

Southern Rhodesia.—Dr. G. A. Jamieson, 4 Chilham Court, P.O. Box 552, Bulawayo, Southern Rhodesia.

Apologies were received from the Ceylon and Eire Medical Associations.

The chairman, in extending a warm welcome to the delegates, expressed regret that the representatives of Ceylon and Eire had not been able to be present. The chairman then referred to the purpose for which the conference had been established and said that it was true to say that much of the present unsettled state in world affairs was very largely due to lack of knowledge and appreciation among the nations of the special national problems affecting every country. This was mainly due to disturbed conditions following the war, and it was felt that in the solution of these problems the medical profession could play a part not only from the medical point of view, but also from the point of view of the general welfare of the community. In the field of medicine fraternal relationships existed between members of the medical profession, and they thus could exercise considerable influence for good quite out of proportion to their actual numbers. Conditions of life and work varied considerably in the different countries, but human nature was much the same the world over; the real value of any new theories or plans could best be judged by practical experience and the assessment of the results which followed their application. The papers and addresses to be given at the meeting would outline how some of the medical and social problems were being dealt with in Australia. It might be that the visiting delegates would learn something of value, and Australia certainly hoped to learn from them in the exchange of views.

The chairman then read a message of greeting from the Medical Association of South Africa, and the delegates present also conveyed warm greetings from their associations.

General Business.

Expenses of the Meeting.

In a letter forwarded several months previously to constituent associations, Dr. Charles Hill, the honorary

secretary-treasurer, had submitted a tentative estimate of the expenses of the conference, and in doing so made the suggestion that if any delegate were not present and the expenses were thus reduced, the amount of the reduction be credited to Great Britain, who carried the heaviest load. In this statement it was estimated that the total expenses, including subsistence of £3 sterling per day, would work out at £4305. This amount included a total of £893 for Ceylon and Elre. Taking the total of £4305 and allotting it on the basis agreed upon at Saskatoon, the proportion worked out as follows:

	£	s.	d.
Australia	538	3	0
Canada	602	14	0
Ceylon	43	1	0
Elre	129	3	0
Great Britain	2,303	3	0
India	86	2	0
New Zealand	236	15	0
Pakistan	43	1	0
South Africa	279	17	0
Southern Rhodesia	43	1	0

Deducting from £893 the sum of £152 4s., representing the allocation to Ceylon and Elre of their share of the total, which it was assumed they would not be asked to pay, the net surplus would be £720 16s. Deducting this amount from Great Britain's share would mean that Great Britain would be required to pay £1583 7s.

It was unanimously agreed to accept this arrangement of the sharing of the costs.

Future Meetings of the Conference.

It was decided to accept the invitation of the Medical Association of South Africa to hold the next conference at Johannesburg on July 11 to 13, 1951. In regard to this conference it was decided to recommend to the constituent associations that the meeting be spread over four days, the first and last sessions to be free of formal papers.

It was decided that the question of holding meetings subsequent to the meeting in South Africa in 1951 be referred to the constituent associations for consideration, having regard particularly to the fact that an invitation had been extended by the Indian Medical Association to hold a meeting in India, preferably in 1952, or in 1953, and also that it was the desire of the New Zealand Branch of the British Medical Association to hold a meeting in the near future in New Zealand.

Assistance to Constituent Member Nations.

A communication was received from the Pakistan Medical Association suggesting that the British Commonwealth Medical Conference might devise ways and means to enable the national medical associations of the Commonwealth countries to act as a single body in an emergency to come to the help of the country of a member association, for example, during severe epidemics or any catastrophe like an earthquake, or in the event of aggression by another nation. It was suggested that help might be forthcoming by, *inter alia*, supply of drugs and equipment, the sending of medical missions, and approaching national and international organizations, such as the Red Cross, World Health Organization and the World Medical Association. After very full and frank discussion it was decided that the conference was in complete sympathy with the views expressed by the Pakistan Medical Association, and that it would be the desire of the member nations within the British Commonwealth to do all within their power to meet the needs of a member nation.

Medical Licentiatees of India.

A communication was received from Dr. A. N. Roy, President of the Bengal Provincial Branch of the All-India Medical Licentiatees' Association, requesting that all bans that stood in the way of advancement of members of the All-India Licentiatees' Association from Commonwealth education institutions be removed, as by so doing the goodwill of the largest section of the statutorily qualified medical practitioners of India who formed about 50% of the membership of the Indian Medical Association would be gained.

After a full discussion it was decided to inform Dr. Roy that post-graduate study facilities were a matter for each country concerned, but that his request had been sympathetically considered by the conference and that it was the opinion of conference that member countries within the British Commonwealth of Nations were anxious to make available post-graduate study facilities within their areas to

other member countries to the degree that this was possible, having regard to the post-graduate requirements of their own students.

Formal Papers.

A New Conception of a National Health Service for Australia.

The Right Honourable Sir Earle Page, Minister of Health of the Commonwealth of Australia, delivered an address entitled "A New Conception of a National Health Service for Australia". This will be published in full in the report of the meeting of the Federal Council of the British Medical Association in Australia in next week's issue.

The Resistance of the Medical Profession in Australia to Socialized Medicine.

Dr. H. R. R. Grieve read a paper entitled "The Medical Profession's Fight Against Socialized Medicine in Australia". He gave a comprehensive account of the different stages of the fight which had been waged by the medical profession in Australia since 1937 against threats of socialization and discussed the lessons to be learned therefrom.

Sir Earle Page's paper and Dr. Grieve's paper were discussed together.

Dr. E. A. Gregg discussed the condition of affairs in England and said that he wished to remove the impressions of sadness and grief for a lost cause. The medical profession in Britain was not down and out. They had a very strong medical committee which was meeting the Ministry of Health regularly. The Ministry was from time to time being reminded that the doctors of the country were not prepared to carry out the service, no matter what conditions were forced upon them. If the doctors felt that the conditions were such that they were no longer justified in carrying them on, they had the prime resolve to assist professional brothers to go out of the service and refuse to go on with it, should the Government at any time insist on imposing upon them conditions that they felt to be intolerable.

Dr. H. K. Pacey told the story of the development of the Social Security Scheme in New Zealand. He explained that there had been a plan for voluntary health insurance on a voluntary basis, which was almost identical with the scheme outlined by Sir Earle Page, but the Labour Government had refused to have anything to do with it.

Dr. A. H. Tonkin explained that it was impossible to implement a scheme in South Africa by which two and a half million Europeans would support eight million natives. He described a system of free hospitalization which had been started in the Transvaal—it seemed to be working satisfactorily, but was costing a lot of money.

Dr. H. McPhedran said that so far they had not solved the problem of the lower income group in Canada. He thought that a great deal might be done by the scheme submitted by Sir Earle Page.

Dr. G. A. Jamieson said that there was a scheme in Southern Rhodesia by which the well-to-do were left to look after themselves, the middle income group were to be provided for by a medical aid scheme and the lower income group were to be a charge on the Government.

Medical Education in Australia.

Dr. J. Kempson Maddox, Past President of the New South Wales Branch of the British Medical Association, read a paper entitled "Medical Education in Australia". He presented an historical survey of the development of the four medical schools in Australia, together with an account of the curricula and standards of medical education in Australia and a comparison with those of other countries.

Post-Graduate Medical Education in Australia.

Colonel A. M. McIntosh, President of the Australian Post-Graduate Federation in Medicine, read a paper entitled "Post-Graduate Medical Education in Australia". His discussion included a survey of the development of post-graduate education and a broad account of the facilities now available to Australian graduates as well as to overseas visitors.

Medical Journalism in Australia.

Dr. Mervyn Archdall, Editor of THE MEDICAL JOURNAL OF AUSTRALIA, gave an account of medical journalism in Australia and made special reference to THE MEDICAL JOURNAL OF AUSTRALIA. He divided the history of medical journalism in Australia into three periods. During the first period, which began in 1804, articles on medical subjects such as clinical reports were published in newspapers. The second period began in 1846 when the first medical journal appeared; it ended in 1914 when, after the establishment of the Federal

Committee of the British Medical Association in Australia, the six Branches united to establish the Australasian Medical Publishing Company, Limited, and THE MEDICAL JOURNAL OF AUSTRALIA made its appearance. The activities of the company were described and an outline was given of the equipment of The Printing House. The editorial set-up was explained in some detail, together with the arrangements for the maintenance of a liaison between the Editor and the Branches of the British Medical Association. The other medical journals published in Australia were mentioned. An invitation was given to delegates to visit The Printing House before they left Australia.

Tropical Disease in Australia.

Dr. C. E. Cook, Commonwealth Health Department (Australia), discussed "The Problem of Tropical Diseases in Australia, with Special Reference to the Care of the Aboriginal Population". He presented a detailed account of the historical development of the northern or tropical part of Australia, and of its problems in relation to climate and population, and he discussed the history of the three main medical problems of the area—malaria, hookworm and leprosy.

The Flying Doctor Service of Australia.

Dr. G. Simpson, Honorary Secretary, Federal Council of the Flying Doctor Service of Australia, read a paper on "The Flying Doctor Service in Australia", which was regarded as the highlight of the conference. His historical and factual account of this service was interspersed with numerous illustrations, a recording of an actual radio consulting session, a sound film of an emergency flight, and demonstrations of the actual wireless equipment used. Also in attendance were the Very Reverend Dr. John Flynn—"Flynn of the Inland"—who was responsible for the creation of the service, and Dr. Alan Vickers, the Flying Doctor, now stationed at Charleville, both of whom gave short addresses.

The Public Hospital System in Queensland.

Dr. A. E. Lee gave an account of "The Public Hospital System in Queensland", in which he told of the replacement of an honorary system of hospital service by a method of staff payments, and the development and implications of a completely free hospital service to every person who desired it.

Congenital Malformations following Rubella.

Professor Lorimer Dods, Professor of Child Health, the University of Sydney, discussed an aspect of child health in Australia in a paper on "Congenital Malformations following Rubella, and Other Noxious Influences during Pregnancy", which was presented as an account of research work in Australia by Dr. Norman McA. Gregg in the course of a busy ophthalmic practice.

Medical Registration in Australia.

Sir John Newman Morris, President of the Medical Board of Victoria, in a talk on "Medical Registration in Australia", discussed the various provisions of the Acts governing medical practice in the different States.

The Medical Bill, 1950, of the United Kingdom.

Dr. A. Macrae, Deputy Secretary of the British Medical Association, discussed "The Medical Bill, 1950, of the United Kingdom", with its provision for the requirement of post-graduate hospital experience before the granting of full registration.

The Organization of the Medical Profession in Australia.

Dr. W. F. Simmons read a paper on the "Organization of the Medical Profession in Australia". He described the development of the six Branches of the British Medical Association in Australia, and of the Federal Council, the latter body acting for and on behalf of the Branches in matters affecting the profession as a whole, with remarks on the Australasian Medical Congresses and the Government Medical Services. He submitted that the organization of the profession in Australia should be regarded as one unit in the organization of the medical profession of the British Commonwealth of Nations.

Social Functions.

During the conference the delegates were the guests of the Federal Council of the British Medical Association in Australia to luncheon on each of the three days, and to dinner on the final night. Subsequently, all delegates attended a meeting of the Federal Council and the Australasian Medical Congress, with its accompanying social activities.

British Medical Association News.

SCIENTIFIC.

A MEETING of the Victorian Branch of the British Medical Association was held on February 1, 1950, in the Medical Society Hall, East Melbourne, the President, Dr. ROBERT SOUTHEY, in the chair.

The Prevention of Deformity in Rheumatic Disease.

Dr. MICHAEL KELLY read a paper entitled "The Prevention of Deformity in Rheumatic Disease" (see page 1).

Dr. JOHN JENS, who opened the discussion, said that the primary basis of all treatment, whether medical or surgical, must be rest, as was exemplified in Dr. Kelly's paper. Surgical treatment in itself must be directed towards three ends: relief of pain, improvement of function and correction of deformity. Traction had an important part to play in all of those, but particularly for lower limb arthritis; it was especially applicable to the knee and the hip. The slighter deformity of the earlier stages was easily correctable, but the fixed contractures that occurred later required more radical means, not only towards the three basic principles already mentioned, but also in the actual eradication of the pathological process. Arthroplasty was the most popular surgical procedure for the various arthritic conditions, and the recent success of vitallium-cup arthroplasty for arthritic conditions of the hip joint had given relief from pain and improvement of function to many sufferers. Arthroplasty of the metatarsophalangeal joint was a most successful procedure, while excision of the proximal row of the carpal bones in wrist conditions had now an established place. For the straight-out relief of pain arthrodesis was the recommended treatment, but it had to be remembered that the joints at which compensatory movements were to occur had to be relatively free of any arthritic condition themselves. Finally, in limbs with the severest fixed deformities, it might be easier to perform an amputation.

Dr. FRANK MAY congratulated Dr. Kelly on his paper, pointing out that, as Dr. Kelly had shown, deformity of the hand came with muscle imbalance; it was imperative that the medical man attending the case see that the patient understood the pathology and the mechanism of production. Instruction had to be given and, with the help of the physiotherapist, exercises prescribed to prevent deformity as far as possible. With an osteo-arthritic hip joint, the patient was told as much as possible about the condition, so that he might understand that pain, stiffness and deformity were the main features and that stiffness and deformity would develop and increase without proper graduated exercises. In early cases much good could be done with that routine. Dr. May asked what Dr. Kelly, or any other person present, had to offer in the treatment of the rheumatoid knee in which there was flexion plus gross abduction.

Dr. LEIGH WEDLICK expressed appreciation of Dr. Kelly's extensive work on a very interesting aspect of the treatment of rheumatoid arthritis. He felt that the greatest difficulty was to know when to move and when to rest, and that care was necessary to try to preserve the balance and to avoid any extreme view. In his experience ankylosis, particularly of the knee joints, was by no means uncommon following immobilization. In England at the present time that was realized and immobilization in plaster was never persevered with for more than two weeks without removal of the limb from the plaster cast for daily movements. He felt that it was probably a reasonable compromise to "bi-valve" a cast early, and to institute the daily movements within the first two or three weeks. Nevertheless, he felt that they had been too prone in the past to neglect immobilization, and they all owed a debt to Dr. Kelly for the stress he had laid on that aspect. The use at night of plaster casts purely to prevent deformity was, of course, common and had been accepted for a considerable time.

Dr. DOUGLAS GALBRAITH, in congratulating Dr. Kelly on his paper, said that, although his experience of rheumatoid arthritis was largely confined to children, he fully agreed with the need for complete immobilization of the painful joint for a period of perhaps two or three weeks. He felt that one of the difficulties in rheumatoid arthritis was what could be termed "bitser" treatment—a bit of immobilization mixed up with a bit of movement. One had to follow a clearly defined policy, with a period of complete immobilization and then a period of steadily increasing exercise and activity. In rheumatoid arthritis attention was often so completely concentrated on the joint condition that the changes in the muscles were overlooked. Treatment of the muscles was an important part of the whole régime.

Dr. Kelly, in reply, thanked the speakers for their remarks and said that he welcomed criticism as much as praise. In reply to Dr. Jens, he agreed that continuous traction was useful in overcoming the muscular spasm in flexion deformities of the knee; but in most cases it was inapplicable because of the shortage of hospital beds. He was glad that Dr. Jens had stressed the value of operations in correcting deformities; there must be many thousands whose deformities had not been relieved by simple operations merely because they did not know that such operations were feasible. In reply to Dr. May, he agreed that the pathology of the disease and the causes of muscular wasting should be explained to the patient in simple terms, the better to gain her cooperation in the performance of exercises. Flexion-abduction deformity of the knee was brought about by absorption of the lateral condyles of the femur and the tibia. In one case a complete lateral dislocation of the knee had followed treatment of such a deformity with a leg plaster cast. It was reduced and the patient was made to wear a calliper for a year. In reply to Dr. Strang, he agreed that the tendons sometimes degenerated primarily, yet in other cases the process spread from adjacent synovial and periarticular tissues. The snapping finger was an instance of involvement of tendon and sheath opposite the metacarpophalangeal joint. A few weeks of immobilization of the joint often caused the inflammation to resolve. Flexion deformity of the wrist, even in its early stages, was often difficult to correct by manipulation, because of the shortening and spasm of the flexor muscles. In reply to Dr. Galbraith, he agreed that the muscles themselves often appeared to be involved primarily. He recalled especially one patient with great pain and stiffness but no swelling of joints, whose intense muscular wasting equalled that of advanced muscular dystrophy. Modern methods of investigation, he agreed, had shown various abnormalities of liver function in rheumatoid arthritis. Perhaps, however, some of those were not primary but secondary toxic effects of the multiple inflammatory foci. In reply to Dr. Keon-Cohen, he agreed that for fractures and other injuries to the hand, the hand should be splinted with the metacarpophalangeal joints in semi-flexion. In rheumatoid arthritis, however, those joints should be splinted in full extension in order to assist the long flexors to flex the interphalangeal joints. In reply to Dr. Wedlick, he agreed that ankylosis of the knees in extension might follow immobilization after forced extension. But that danger must be faced; a patient with two straight legs could walk, while two bent knees meant life in a wheelchair. A patient who had had a single painful flexed knee was usually quite delighted to substitute for it a painless straight knee; that in fact was the objective of arthrodesis. But one such patient recently had given him much anxiety by developing, more than a year after fixation of the knee in extension, painful swelling of the second knee. In another patient whose painful flexed knee was arthrodesed in extension by operation, a flexion deformity of the apparently healthy knee developed some years later. The Bath surgeon, C. E. Kindersley, who was the most prominent advocate of immobilization of rheumatoid joints, had reported in the *Journal of the Royal Institute of Public Health and Hygiene*, Volume I, 1938, page 400, that he had unwittingly given a patient a supracondylar fracture of the femur when attempting to correct a flexion deformity of the knee; after prolonged immobilization to heal the fracture, he had been surprised to find a good range of movement in the knee. Dr. Kelly insisted again that prolonged stay in hospital was a bad thing for the patients under discussion, most of whom had an amazing reserve of courage and fighting power. Attending the arthritic clinic of the Royal Melbourne Hospital was a woman of sixty-seven years, most of whose joints were deformed, and who could move around only with the aid of crutches and a walking calliper; she looked after her bedridden mother at home.

AUSTRALIAN SOCIETY OF ANÆSTHETISTS.

The annual general meeting of the Australian Society of Anæsthetists was held in Brisbane on May 29, 1950. The President, Dr. D. G. Renton (Victoria), was in the chair and eighteen other members were present.

The minutes of the previous annual general meeting, held in Melbourne in March, 1949, were read and confirmed.

The outstanding item in the report of the Secretary was the travelling scholarship in anaesthesia, offered by the Association of Anæsthetists of Great Britain and Ireland. It was announced by the President that this had been awarded to Dr. Frank Leventhal, of Elizabeth Bay, New South Wales.

The report of the Treasurer, Dr. H. E. W. Lyons (South Australia), showed the society to be in a satisfactory financial position.

The curator of the museum and library, Dr. Geoffrey Kaye (Victoria), reported a number of additions, but deplored the lack of space for the proper display of many articles of interest and value.

Election of Office Bearers.

The following officers were elected for 1950-1951: *President*, Dr. A. W. Robertson (Queensland); *Vice-President*, Dr. S. V. Marshall (New South Wales); *Secretary*, Dr. J. E. Barker (South Australia); *Treasurer*, Dr. H. E. W. Lyons (South Australia); *Curator of the Museum and Library*, Dr. Geoffrey Kaye (Victoria).

Correspondence.

THE AUSTRALIAN OFFICIAL MEDICAL HISTORY OF THE 1939-1945 WAR.

SIR: I wish to inform my professional colleagues that the text of a volume dealing with the clinical aspects of their work and experiences with the Australian Forces has now been completed. In accordance with the views of the war medical historians of the British Commonwealth and the United States of America, priority of publication is being given to the clinical material. This volume describes the types of medical and surgical work done by Australians during the war, and aims at giving a scientific background to the campaigning and related administration which I hope will be described from the medical aspects in other volumes. No estimate can be given of the time likely to lapse before publication; the general arrangements are not yet complete and there will probably be considerable delay.

Yours, etc.,

ALLAN S. WALKER.

Medical Historian,
East Block,
Canberra.
June 15, 1950.

A MORE REALISTIC VIEW OF TUBERCULOSIS.

SIR: Dr. Short has posed predominantly sociological questions relating to case-management of the minimal tuberculous lesion; Dr. White, in reply, demonstrates his respect for both the integrity of human life and the unpredictability of the apparently quiescent lesion.

The unwritten point around which both authorities' arguments appear to me to hinge is that the management of the minimal lesion is an extremely difficult problem, calling for a nice appraisal by the clinician of all relevant detail—detail supplied by the radiologist, pathologist, nursing staff, almoner and, last but by no means least, patient and family. That this problem is frequently tackled by general practitioners may occasion surprise and admiration—surprise that it should be necessary and admiration that it is even attempted. Most practitioners can tend the far advanced patient with success, for treatment is almost entirely palliative, and in their special position of trust and confidence are at great advantage to minister to the comfort of their patient and the well-being of the family. But it is accepted as a matter of special experience and skill, to be able to assess the significance of investigations used routinely in cases of minimal and doubtfully quiescent lesions. And I daresay that, had Dr. White cared to take off the gloves, he would have said that anyone who knows his job should not fall into the errors that have thrown the subjects of Dr. Short's letters into the slough of moral disintegration which he mentions. Dr. Short calls for a more realistic concept of tuberculosis, but what appears to me to be requisite is the realistic concept that can be had only by adequate schooling and experience. There is adequate literature in this particular field: the recent work of the Prophit Trust, for instance, cannot be accepted unreservedly for this community, but it does give some indication of what to expect of the minimal lesion following on infection in young adults.

Macpherson (1943) showed that there was little tendency towards spontaneous healing in these lesions. The Trust (1947) reported that 50% of such lesions required sanatorium treatment. From 24% to 28% cavitated, three-fifths of them

within the first year and one-fifth more the following year; and 22% of lesions held to be quiescent when first seen, subsequently broke down.

These figures show clearly that such lesions cannot be ignored, and indicate the risk the patient runs with what is so euphemistically called "a spot on the lung". While Dr. Short does not advocate, ignoring them, under the heading "a more realistic view", there may well lurk great danger that, in lieu of referring a minimal case for adequate assessment, the practitioner may assume radiological observation with an occasional sputum test to be sufficient. It appears to be frequently overlooked that a persistently "sputum-negative" patient can be undergoing parenchymal liquefaction, unidentifiable in the absence of a patent draining bronchus. One would learn more by taking an accurate 4.30 p.m. temperature than by examining sputum from a minimal lesion: the same could not be said against culturing a bronchial washing, a fasting gastric contents or a laryngeal swab, however. The plain chest ray and sputum smear are well known to be teeth of a comb too widely set to extract significant fragments for minimal disease.

The following case histories illustrate the fallacies of these criteria and possible repercussions.

J.M., aged 38 in 1945, male, X-ray examination June, 1945, sputum negative July and August, 1945; X-ray examination January, 1946, no change; informed he had a scar which was healed; no further observation recommended.

I.M., his wife, aged 38 in January, 1946, cough, hemoptysis, 30 weeks pregnant, X-ray examination clear; sinuses infected; antral puncture; no further observation recommended.

L.M., the sixth child, aged two years, June, 1948, admitted to hospital, milillary tuberculosis.

June, 1948. Parents' X-ray examination: J.M., no change; I.M., cavitation.

All five elder children infected, and a seventh child expected. Diagrammatically the sequence appears as follows:



J.M., 1945.

I.M., 1948: cavity.

L.M., 1948: milillary disease.

In 1949 J.M. sixteen pounds below normal weight; cough and wheeze. Evening temperature = 98.8°/99.2°; gastric contents, moderate growth of *Mycobacterium tuberculosis*; erythrocyte sedimentation rate, 14/30 Westergren; X-ray examination, no change since 1945; tomogram, right upper lobe dilated and distorted apical draining bronchi.

The morals of this family's case management are: (i) A repeatedly negative sputum does not mean that a minimal lesion is quiescent or non-infectious. (ii) An unchanging straight skiagram does not indicate quiescent disease. A clear skiagram in a contact does not mean that the contact is not at that moment developing a pulmonary lesion. (iii) The treatment required for a minimal focus is only one very small part of the multiple responsibilities a practitioner shoulders once he undertakes the management of such a case.

Minimal lesions warrant very careful case-management—almost more so than moderate or far advanced. Prevention can be thought of in a proportion of the latter: but it is mainly from amongst the contacts of minimal disease that the word prevention has much practical application.

By all means let Dr. Short's patient be regarded with a rational outlook. Admission for six weeks should be sufficient (Brooks, 1944; Traill, 1943) both to assess the patient's disease and to investigate his familial contacts with an eye to infection that has occurred and infection likely to occur; and suitable provision then made for each contingency, by advice on home hygiene, by effecting segregation and vaccination of susceptibles, and by routine periodic X-ray examination of the infected.

As for the unfortunate patient there can be no rule of thumb; "sputum-negative" cases will cavitate within weeks; "sputum-positive" cases will spontaneously heal. Far advanced disease will linger on to senile decay, infecting as it goes; and good "chronics" will work a fifty-hour week and live to tell the tale. Somewhere amongst these paradoxes the skill of the clinician must come into play; and

from a very short experience in tuberculosis I am convinced that both very long experience and maturity of judgement are required to avoid arresting the disease yet killing the patient.

Yours, etc.,

Australian Red Cross Society,
Eva Hordern Hospital,
Strathfield,
New South Wales.

R. HAMBRIDGE.

June 6, 1950.

References.

Brooks, W. D. W. (1944), "Management of Minimal Pulmonary Tuberculosis Disclosed by Fluorography", *The Lancet*, Volume I, page 745.

Macpherson, A. Margaret C. (1943), "Childhood Infection and its Relation to Adolescent and Adult Pulmonary Tuberculosis", *British Medical Journal*, Volume II, page 98.

Royal College of Physicians: Prophit Tuberculosis Survey (1948), "Tuberculosis in Young Adults", H. K. Lewis and Company, Limited, London.

Traill, R. R. (1942), "Early Diagnosis of Pulmonary Tuberculosis", *The Lancet*, Volume II, page 413.

OBITUARY: JOSEPH FOREMAN.

Sir: Re the obituary I wrote about Dr. J. Foreman. Mr. Alfred Stephen has communicated with his relatives and the authorities and is now definitely sure that Dr. Foreman was born in 1852. This means that my statement that he was in his hundredth year should really be corrected.

Yours, etc.,

Craigish,
185 Macquarie Street,
Sydney.

HERBERT SCHLINK.

June 19, 1950.

Australian Medical Board Proceedings.

NEW SOUTH WALES.

THE undermentioned have been registered, pursuant to the provisions of the *Medical Practitioners Act*, 1938-1939, of New South Wales, as duly qualified medical practitioners:

Borland, William McLean, M.B., B.S., 1924 (Univ. Melbourne), c.o. Snowy Mountains Hydro-Electric Authority, 85 O'Riordan Street, Alexandria.

Gray, Andrew Alexander, M.B., Ch.B., 1936 (Univ. Edinburgh), c.o. Masonic Club, Sydney.

James, Harold Marcus Rhys, M.B., B.S., 1948 (Univ. London), c.o. Royal Australian Navy, G.P.O., Sydney.

Kelly, Andrew John, M.B., B.S., 1947 (Univ. Queensland), c.o. Dr. Unwin, Murwillumbah.

Nash, Stanley Allan, M.B., B.S., 1950 (Univ. Queensland), 7 Francis Street, Bondi.

The following additional qualification has been registered:

Lawes, Frank Augustus Essery, 185 Macquarie Street, Sydney (M.B., Ch.M., 1921, Univ. Sydney, M.R.A.C.P., 1939), F.R.A.C.P., 1950.

QUEENSLAND.

THE undermentioned have been registered, pursuant to the provisions of *The Medical Acts*, 1939-1948, of Queensland, as duly qualified medical practitioners:

Coates, Dorothy Ravelle, M.B., B.S., 1949 (Univ. Adelaide), c.o. Hospitals Board, Mareeba.

De Bruin, Arthur James, M.B., B.S., 1945 (Univ. Ceylon), 32 Longland Street, East Brisbane.

Ducray, Suzette Eleanor, M.B., B.S., 1949 (Univ. Adelaide), c.o. Hospitals Board, Atherton.

Lakin, Horace Henry, L.M.S.S.A. (London), 1929, c.o. Bank of New South Wales, Post Office Branch, Queen Street, Brisbane.

Smith, George Birch, M.R.C.S. (England), 1944, L.R.C.P. (London), 1944, M.B., B.S., 1948 (Univ. London), c.o. Hospitals Board, Maryborough.

The following additional qualification has been registered:

Portley, David Michael, Hospitals Board, Bundaberg, F.R.C.S. (England), 1949.

TASMANIA.

THE undermentioned have been registered, pursuant to the provisions of the *Medical Act*, 1918, of Tasmania, as duly qualified medical practitioners:

Langley, Lindon Archdall, M.B., B.S., 1936 (Univ. Melbourne), D.P.M., 1942 (Univ. Sydney), Launceston General Hospital, Launceston.
Jarvis, Ronald Harris, M.B., B.S., 1948 (Univ. Adelaide), Scottsdale, Tasmania.
Harris, Ian Antrobus, M.B., B.S., 1949 (Univ. Adelaide), Launceston General Hospital, Launceston.
Mair, Robert George, M.B., Ch.B., 1947 (Univ. Aberdeen), Campbell Town, Tasmania.

Medical Societies.

THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA.

A MEETING of the Medical Sciences Club of South Australia was held in the Anatomy Lecture Theatre, Frome Road, Adelaide, on April 14, 1950.

The Action of Chemicals on Cells.

DR. G. M. BADGER discussed the biological action of chemicals on cells. He said that the study of the action of chemicals on cells was difficult for several reasons: (i) the biological assay of drugs was difficult, and could never be carried out very accurately; (ii) the requirements for biological activity might not be the same as those governing the ability of the drug to reach the site of action; (iii) metabolic changes could sometimes activate and sometimes inactivate drugs; (iv) the nature of the carrier medium might affect the activity; and (v) the same biological end-

result might be produced (even with closely related drugs) by different mechanisms. Biological activity could sometimes be correlated with certain physical properties which involved the relative distribution of a drug between heterogeneous phases. In that connexion the study of compounds in homologous series was important. In other cases, the activity was determined by the number, position and nature of the chemical groups in the drug molecule. Finally, correlation of activity with certain specific molecular shapes and sizes had often proved useful in designing new medicinals, especially in the field of the sex hormones and analgesics.

Obituary.

FRAMPTON GARNSEY MEADE.

WE are indebted to Dr. E. S. Meyers for the following appreciation of the late Dr. Frampton Garnsey Meade.

Dr. F. G. Meade was a graduate of the University of Melbourne, who practised in Queensland, first for a number of years in the country and later in Brisbane. His medical training was done in the University of Melbourne, where he obtained the M.D. degree. Queensland has been very fortunate in that not a few excellent practitioners of the University of Melbourne have come to practise here and render excellent service to the country people of this State.

It was not until somewhere in 1927 that I met Dr. Meade in connexion with the very difficult problems of contract practice that were facing the Queensland Branch at a time when the Queensland Branch was attempting to introduce the Federal Model Lodge Agreement. As the annual report of the Branch for 1928 states:

The chaotic condition of lodge contract practice in Queensland is primarily responsible for the introduction of the Federal Model Lodge Agreement. . . . Though strenuous resistance was made by the majority of the

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED JUNE 10, 1950.¹

Disease.	New South Wales. ²	Victoria.	Queensland.	South Australia. ³	Western Australia.	Tasmania.	Northern Territory. ³	Australian Capital Territory. ³	Australia. ³
Ankylostomiasis
Anthrax
Beriberi
Bilharziasis
Cerebro-spinal Meningitis	2	..	..	..	..	..	2
Cholera
Coastal Fever(a)
Dengue
Diarrhoea (Infantile)	1(1)	..	..	..	..	..	1
Diphtheria	..	5(2)	4(1)	..	1(1)	..	..	..	10
Dysentery (Amoebic)
Dysentery (Bacillary)	..	4(3)	3(2)	..	..	..	..	..	7
Encephalitis Lethargica
Erysipelas
Filariasis
Helminthiasis
Hydatid
Influenza
Lead Poisoning
Leprosy
Malaria(b)
Measles
Plague
Poliomyelitis	..	5	1	..	4(2)	..	..	..	10
Psittacosis
Puerperal Fever
Rubella(c)	2(1)	..	..	..	2
Scarlet Fever	..	11(5)	7	..	3(2)	1	..	..	22
Smallpox
Tetanus	3(1)	..	1(1)	..	..	..	4
Trachoma
Tuberculosis(d)	..	16(14)	7(5)	..	5(5)	3	..	..	31
Typhoid Fever(e)
Typhus (Endemic)(f)
Undulant Fever	..	1(1)	..	..	1(1)	..	..	..	2
Well's Disease(g)
Whooping Cough
Yellow Fever

¹ The form of this table is taken from the *Official Year Book of the Commonwealth of Australia*, Number 37, 1946-1947. Figures in parentheses are those for the metropolitan area.

² Figures not available.

³ Figures incomplete owing to absence of returns from the Northern Territory, the Australian Capital Territory, New South Wales and South Australia.

(a) Includes Moseman and Sarina fevers. (b) Mainly relapses among servicemen infected overseas. (c) Notifiable disease in Queensland in females aged over fourteen years. (d) Includes all forms. (e) Includes enteric fever, paratyphoid fevers and other *Salmonella* infections. (f) Includes scrub, murine and tick typhus. (g) Includes leptospirosis, Well's and para-Well's disease.

friendly societies to its introduction, after a short time its many advantages and the service available under it has won over the majority of lodges affected to its acceptance. The present indication is that in the near future it will be accepted by all friendly societies lodges in the metropolitan area. In its introduction an important departure has been made in the conduct of lodge practice. In future contracts may not be entered into between members and individual lodges, but between members and the central body.

Dr. Meade was appointed a member of a special committee to inaugurate the new service. It soon became obvious that he had extensive and sound knowledge of all matters connected with friendly society lodge practice, so much so that he was chosen as principal speaker in the first conference with the representatives of the friendly societies. He put the British Medical Association case clearly, logically and didactically, so much so that the societies' representative found the association's case unanswerable. Dr. Meade was the type of man a British Medical Association official delights to see on these committees—loyal, efficient and energetic. He was of a very retiring nature and quite unassuming, but, like many quiet people, could rise to the occasion when necessary.

Somewhere in the thirties Dr. Meade went abroad for post-graduate study on diseases of the ear, nose and throat. It was on his return, when we shared a waiting room in Ballow Chambers, that I got to know him quite well and to appreciate his wide knowledge of affairs, the soundness of his work, and his innate strength of character. Unfortunately, after a few years' practice in this specialty, he was forced by illness necessitating bed rest to relinquish practice. His fortitude and patience in his misfortune were much to be admired. After several years, he recovered sufficiently to resume occasional work.

We can do with more people in the profession today like Dr. Meade. I am sure I am voicing the opinion of his colleagues of the stirring times of a generation ago, in the sympathy that they would feel for Mrs. Meade in her irreparable loss.

GEORGE HENRY WICKENS.

We regret to announce the death of Dr. George Henry Wickens, of Melbourne, which occurred on June 14, 1950, at Magnetic Island, Queensland.

Nominations and Elections.

The undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Brown, Kenneth James, M.B., B.S., 1950 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.

Cahill, Michael Edward, provisional registration, 1950 (Univ. Sydney), Wagga Base Hospital, Wagga, New South Wales.

The undermentioned have been elected as members of the New South Wales Branch of the British Medical Association:

Corrigan, Raymond John, M.B., B.S., 1948 (Univ. Sydney), 22 Carabella Street, Kirribilli.

Dalton, Gerald Joseph, M.B., B.S., 1948 (Univ. Sydney), Lewisham Hospital, Lewisham.

Deligdisz, Wolf, registered in accordance with the provisions of Section 17 (1) (c), *Medical Practitioners Act, 1938-1945*, Albury District Hospital, Albury.

Guymer, Max William, M.B., B.S., 1947 (Univ. Adelaide), 28 Glasgow Avenue, Bondi.

Marnie, Philip Muir, M.B., B.S., 1950 (Univ. Sydney), 74 Snape Street, Kingsford.

Morgan, John Patrick, M.B., B.S., 1947 (Univ. Sydney), 70 Melody Street, Coogee.

McFadden, Peter Grant, M.B., B.S., 1948 (Univ. Sydney), "Lochbuie", Myoora Street, Pymble.

McManis, Francis Keith, provisional registration, 1950 (Univ. Sydney), 55 Ashley Street, Chatswood.

Nash, Stanley Allan, M.B., B.S., 1950 (Univ. Brisbane), 44 South Parade, Campsie.

Nash, Thomas Paul, M.B., B.S., 1948 (Univ. Sydney), Saint Vincent's Hospital, Darlinghurst.

Schmalzbach, Oscar, registered under Section 21 of the *Medical Practitioners Act, 1938-1945*, 85a Ocean Street, Woollahra.

Toffer, Oswald Boaz, M.B., B.S., 1950 (Univ. Sydney), 61 Fitzgerald Street, Bondi Junction.

Westphalen, John Brock, M.B., B.S., 1950 (Univ. Sydney), Mater Misericordiae Hospital, Waratah, New South Wales.

Diary for the Month.

JULY 4.—New South Wales Branch, B.M.A.: Council Quarterly.

JULY 5.—Victorian Branch, B.M.A.: Branch Meeting.

JULY 5.—Western Australian Branch, B.M.A.: Council Meeting.

JULY 6.—South Australian Branch, B.M.A.: Council Meeting.

JULY 7.—Queensland Branch, B.M.A.: Branch Meeting.

JULY 11.—New South Wales Branch, B.M.A.: Executive and Finance Committee; Organization and Science Committee.

JULY 14.—Queensland Branch, B.M.A.: Council Meeting.

JULY 17.—Victorian Branch, B.M.A.: Finance, House and Library Subcommittee.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135 Macquarie Street, Sydney): Ashfield and District United Friendly Societies' Dispensary; Balmalm United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phoenix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federal Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178 North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205 Saint George's Terrace, Perth): Norseman Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

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